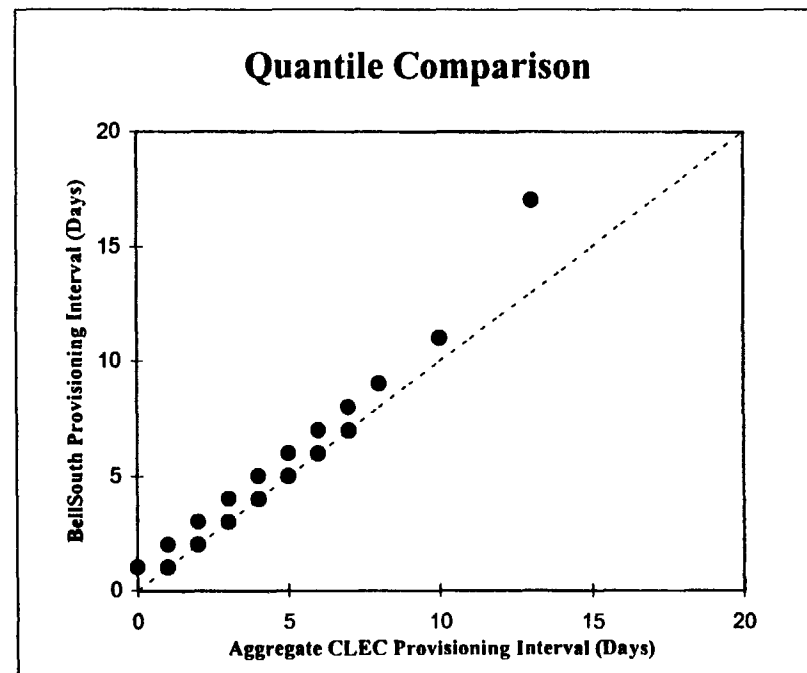
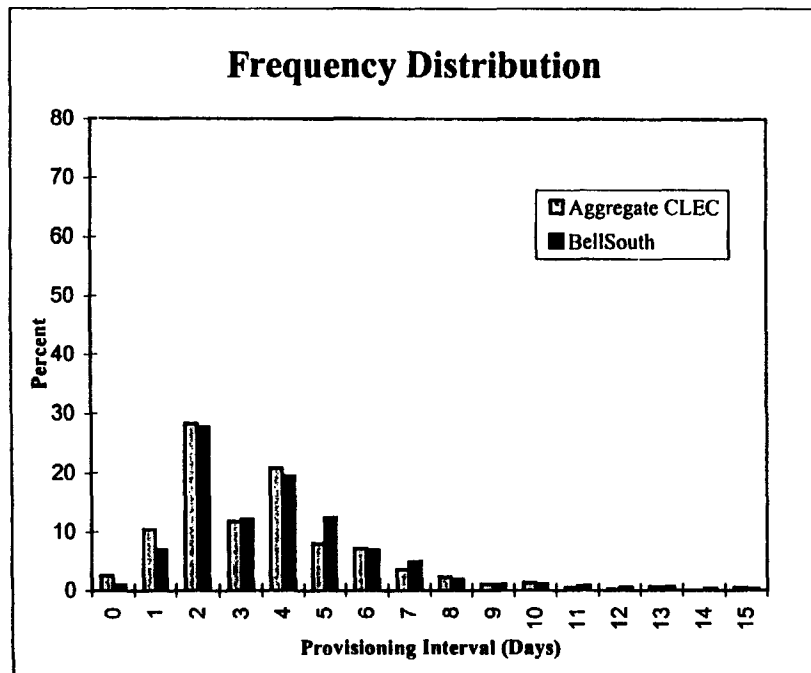


Adjusted August BellSouth and CLEC Completion Interval-Provisioning Dispatched, Residential, Less Than 10 Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	4.34	4.17
CLEC	3.85	3.39
Difference	0.49	

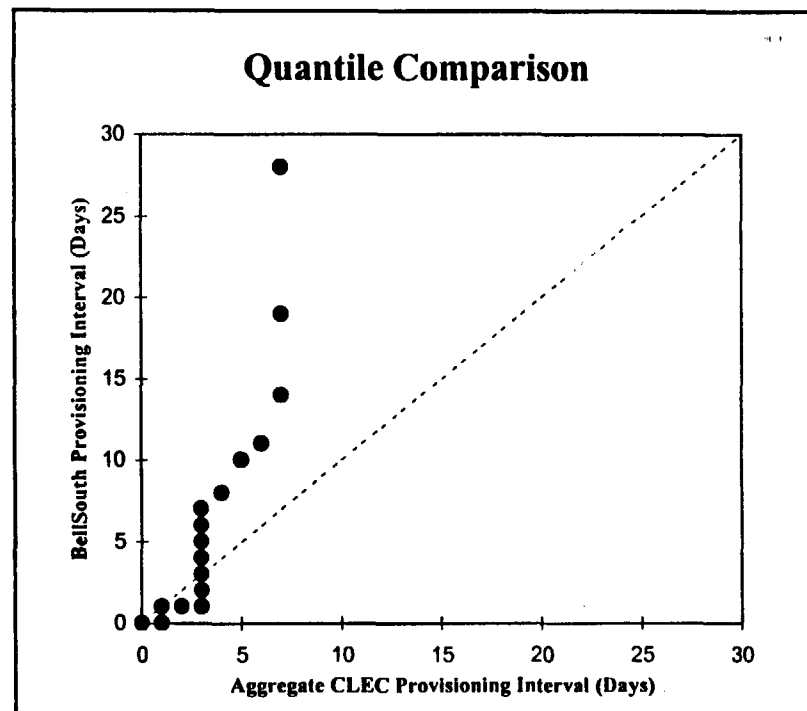
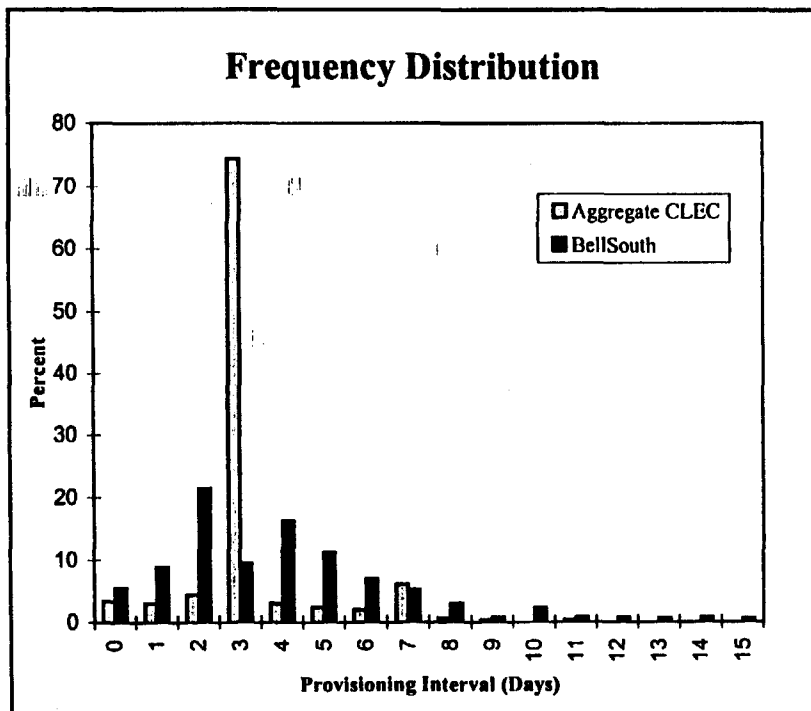
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	3.53	0.0210
FCC	3.56	0.0185
BST	4.40	0.0068

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted August BellSouth and CLEC Completion Interval-Provisioning Dispatched, Business, Less Than 10 Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	5.31	7.18
CLEC	3.26	1.48
Difference	2.05	

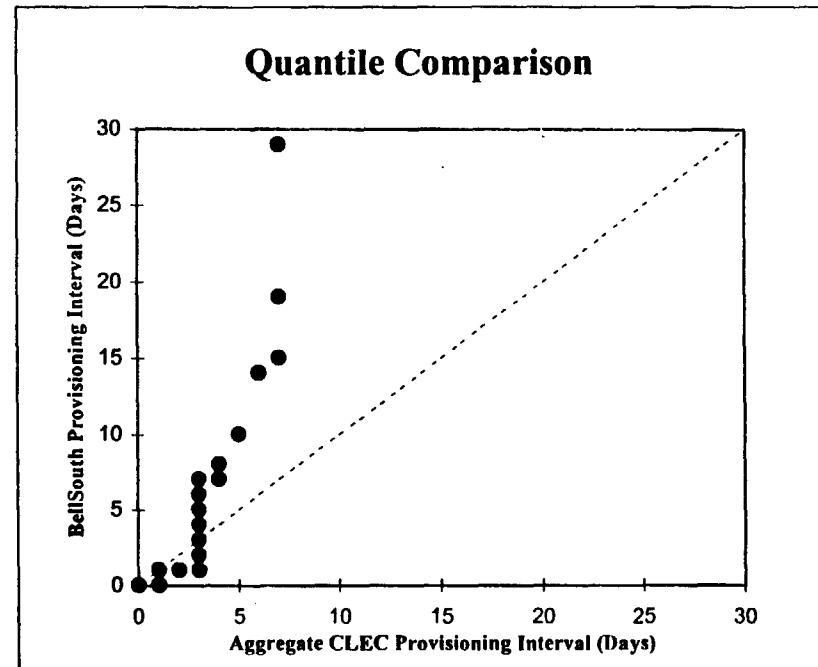
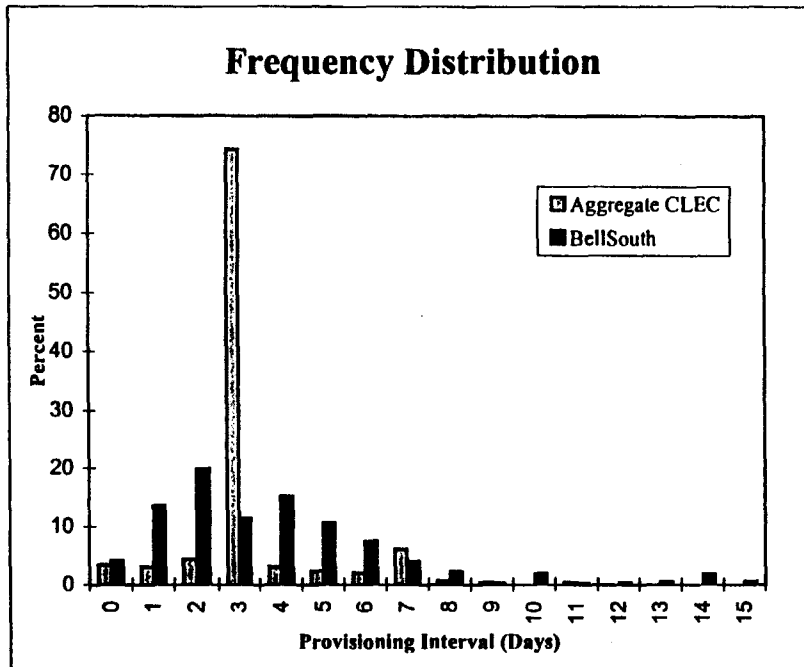
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	4.78	0.0001
FCC	4.91	0.0000
BST	8.67	0.0000

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted August BellSouth and CLEC Completion Interval-Provisioning Dispatched, Business, Less Than 10 Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	5.26	7.29
CLEC	3.26	1.48
Difference	2.00	

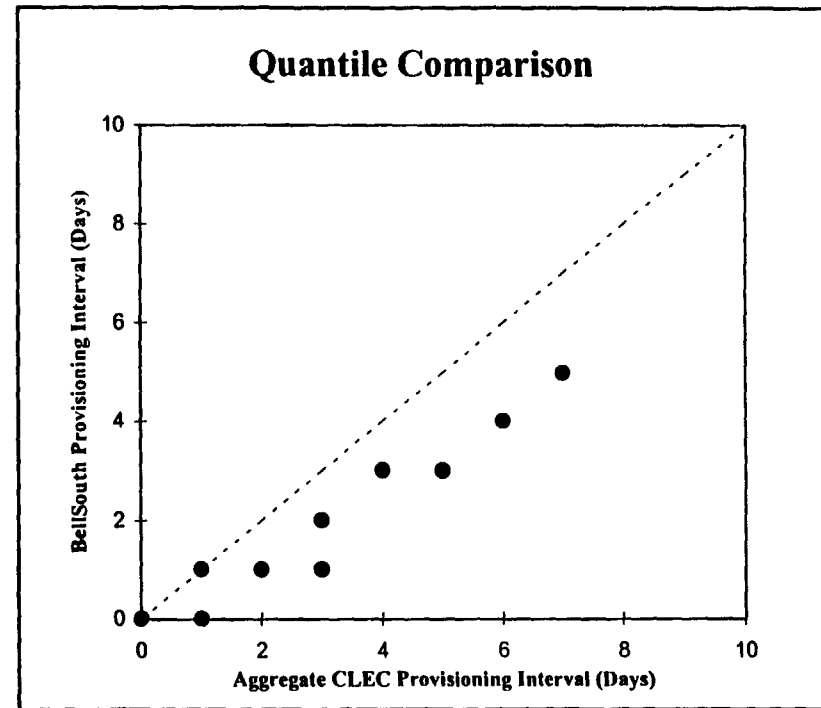
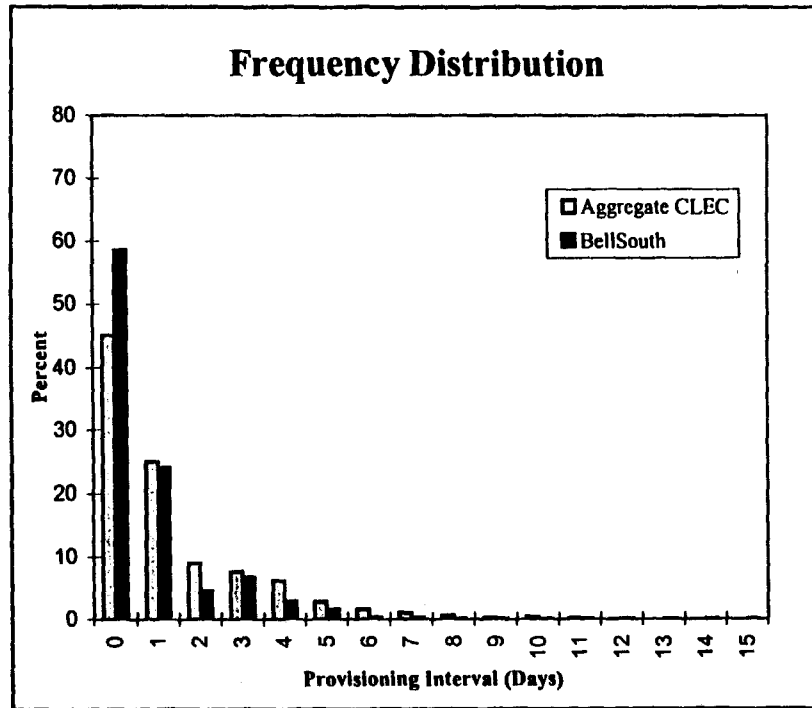
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	4.59	0.0002
FCC	4.71	0.0001
BST	2.50	0.9451

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted August BellSouth and CLEC Completion Interval-Provisioning Non-Dispatched, Residential, Less Than 10 Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	0.88	1.83
CLEC	1.35	1.87
Difference	-0.47	

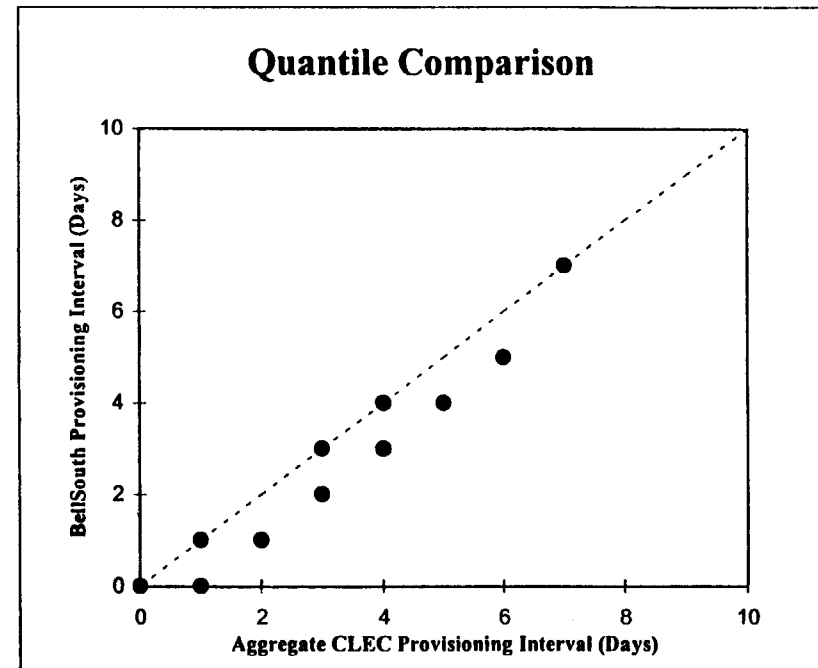
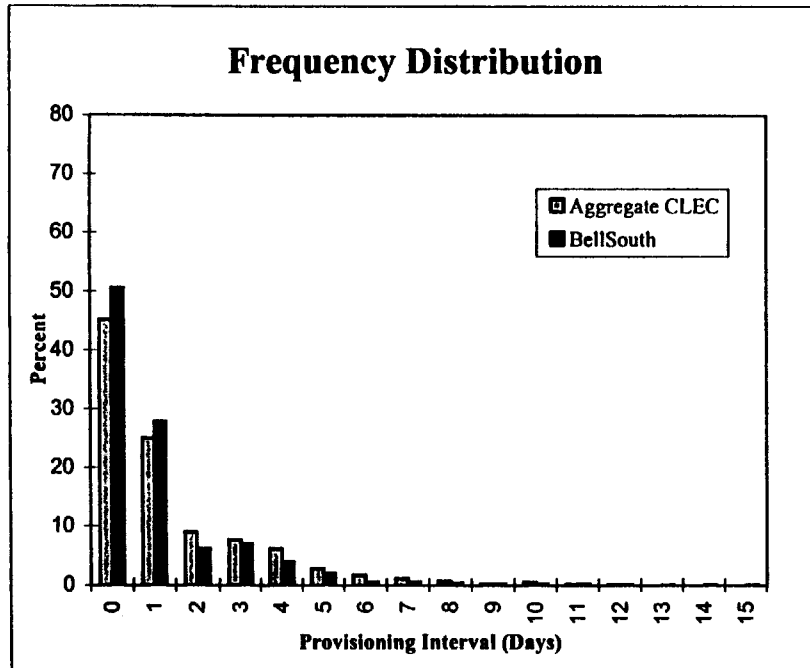
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-29.48	0.0000
FCC	-29.46	0.0000
BST	-10.05	0.0000

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted August BellSouth and CLEC Completion Interval-Provisioning Non-Dispatched, Residential, Less Than 10 Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.15	2.26
CLEC	1.35	1.87
Difference	-0.20	

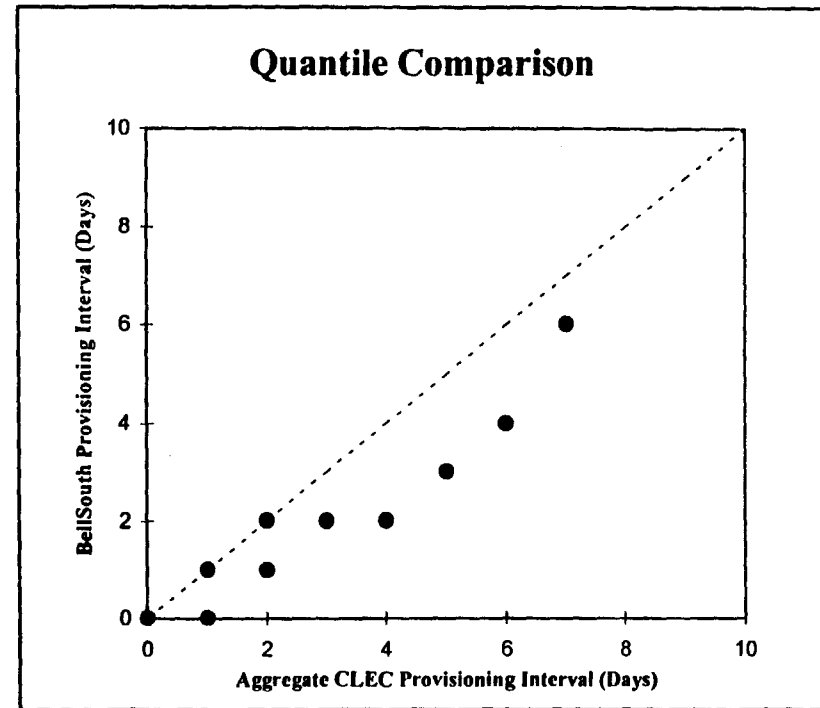
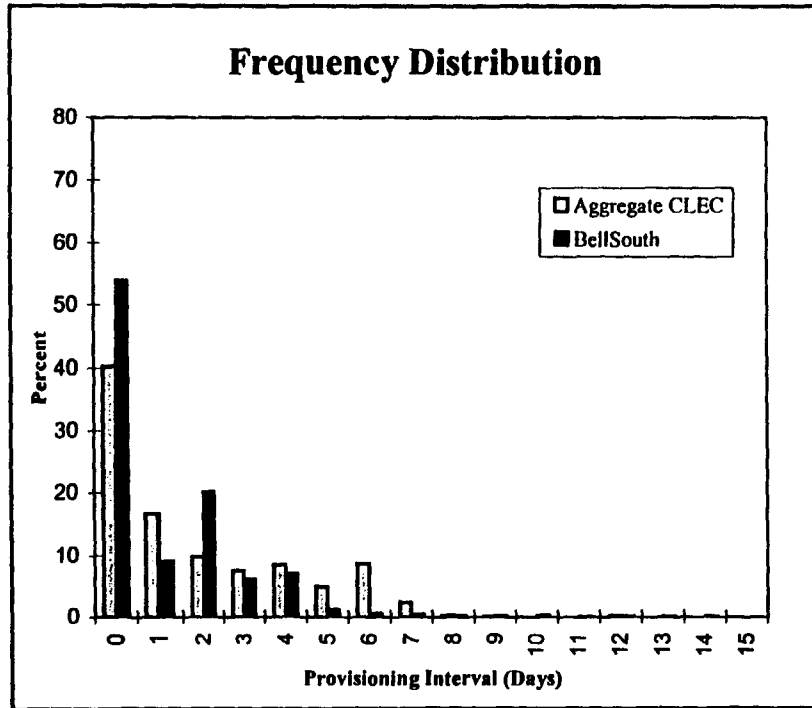
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-10.38	0.0000
FCC	-10.44	0.0000
BST	-4.41	0.0066

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted August BellSouth and CLEC Completion Interval-Provisioning Non-Dispatched, Business, Less Than 10 Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.28	2.65
CLEC	1.97	2.37
Difference	-0.69	

Analytic Measures

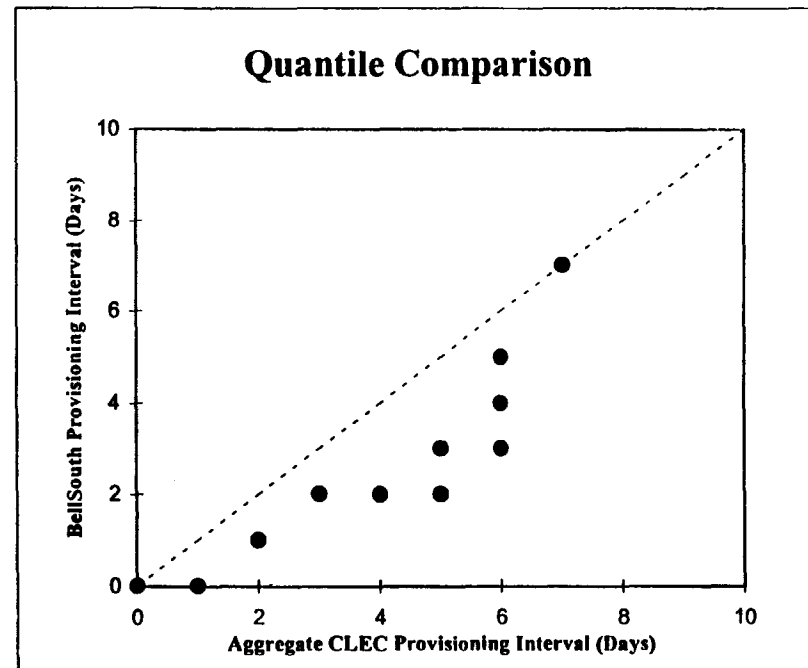
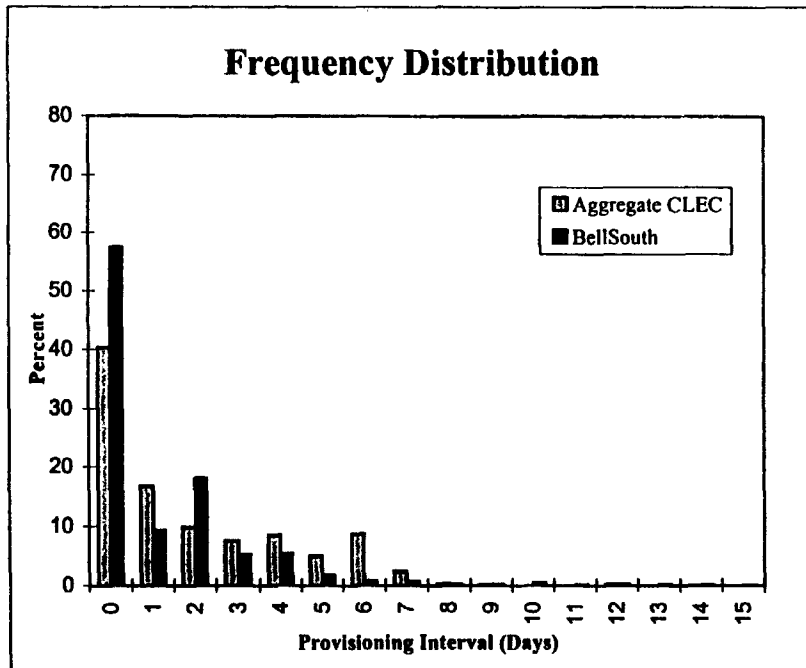
Testing Method	Test Statistic	P-value (percent)
LCUG	-8.58	0.0000
FCC	-8.61	0.0000
BST	-3.12	0.2098

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted

August BellSouth and CLEC Completion Interval-Provisioning Non-Dispatched, Business, Less Than 10 Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.19	2.46
CLEC	1.97	2.37
Difference	-0.78	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-10.44	0.0000
FCC	-10.46	0.0000
BST	-3.57	0.0660

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

SQM: Order Completion Interval

AUGUST

DISPATCH																
SAME DAY		1 DAY		2 DAYS		3 DAYS		4 DAYS		5 DAYS		> 5 DAYS		AVG. (DAYS)		
< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	
CLEC 1																
LOUISIANA																
CLEC AGGREGATE																
LOUISIANA																
- RESALE RESIDENCE	2.64%	0.00%	9.99%	25.00%	26.84%	12.50%	12.14%	12.50%	19.69%	0.00%	7.84%	12.50%	20.86%	37.50%	4.09	5.00
- RESALE BUSINESS	3.17%	0.00%	2.86%	0.00%	5.08%	0.00%	70.79%	16.67%	3.49%	33.33%	2.86%	16.67%	11.75%	33.33%	3.81	5.83
- UNE LOOPS WITH LNP																
BST																
LOUISIANA																
- RETAIL RESIDENCE	2.30%	1.63%	5.94%	4.88%	21.54%	26.02%	11.75%	13.01%	16.19%	19.51%	12.63%	8.94%	29.66%	26.02%	5.38	4.69
- RETAIL BUSINESS	5.05%	0.68%	8.04%	3.42%	18.87%	9.59%	9.09%	11.64%	14.40%	7.53%	10.21%	6.16%	34.34%	60.96%	7.37	15.29

DISPATCH																
0-5 DAYS		6-10 DAYS		11-15 DAYS		16-20 DAYS		21-25 DAYS		26-30 DAYS		> 30 DAYS		AVG. (DAYS)		
< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	
CLEC 1																
LOUISIANA																
CLEC AGGREGATE																
LOUISIANA																
- RESALE DESIGN	8.77%	0.00%	12.28%	0.00%	15.79%	0.00%	15.79%	66.67%	15.79%	0.00%	19.30%	0.00%	12.28%	33.33%	19.70	23.33
- UNE DESIGN	21.05%	100.00%	33.33%	0.00%	21.05%	0.00%	17.54%	0.00%	5.26%	0.00%	1.75%	0.00%	0.00%	0.00%	10.86	2.00
- UNE NON-DESIGN	35.56%	0.00%	35.56%	0.00%	6.67%	0.00%	13.33%	0.00%	0.00%	0.00%	2.22%	0.00%	6.67%	0.00%	10.18	0.00
BST																
LOUISIANA																
- RETAIL DESIGN	10.91%	0.00%	18.21%	20.00%	19.38%	20.00%	11.45%	0.00%	12.17%	20.00%	5.50%	0.00%	22.40%	40.00%	23.00	31.80

Definitions

issue date -- Date service order is entered into the system (not necessarily same as application date)

completion date -- Date on which service order is completed

order completion interval -- computed as order completion interval = completion date - issue date

SQM: Order Completion Interval

AUGUST

NO DISPATCH																
SAME DAY		1 DAY		2 DAYS		3 DAYS		4 DAYS		5 DAYS		> 5 DAYS		AVG. (DAYS)		
< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	
CLEC 1																
LOUISIANA																
CLEC AGGREGATE																
LOUISIANA																
- RESALE RESIDENCE	44.84%	0.00%	24.04%	0.00%	9.08%	0.00%	7.95%	0.00%	6.20%	0.00%	2.81%	0.00%	4.18%	0.00%	1.38	0.00
- RESALE BUSINESS	40.00%	0.00%	17.32%	0.00%	10.54%	20.00%	7.78%	20.00%	8.12%	20.00%	5.02%	0.00%	11.21%	40.00%	1.93	4.20
- UNE LOOPS WITH LNP																
BST																
LOUISIANA																
- RETAIL RESIDENCE	58.29%	0.00%	24.08%	0.00%	4.66%	0.00%	6.80%	0.00%	2.89%	0.00%	1.67%	0.00%	1.62%	0.00%	0.92	0.00
- RETAIL BUSINESS	64.32%	26.88%	9.88%	18.28%	13.88%	4.30%	4.34%	15.05%	4.92%	7.53%	0.84%	2.15%	1.83%	25.81%	1.05	7.27

NO DISPATCH																
0-5 DAYS		6-10 DAYS		11-15 DAYS		16-20 DAYS		21-25 DAYS		26-30 DAYS		> 30 DAYS		AVG. (DAYS)		
< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	
CLEC 1																
LOUISIANA																
CLEC AGGREGATE																
LOUISIANA																
- RESALE DESIGN	80.68%	0.00%	17.05%	0.00%	0.00%	0.00%	1.14%	0.00%	0.00%	0.00%	1.14%	0.00%	0.00%	0.00%	3.91	0.00
- UNE DESIGN	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00	0.00
- UNE NON-DESIGN	77.78%	0.00%	0.00%	0.00%	11.11%	0.00%	0.00%	0.00%	11.11%	0.00%	0.00%	0.00%	0.00%	0.00%	4.67	0.00
BST																
LOUISIANA																
- RETAIL DESIGN	28.57%	0.00%	15.87%	0.00%	28.98%	0.00%	8.35%	0.00%	4.76%	0.00%	1.59%	0.00%	15.87%	0.00%	19.14	0.00

Definitions

Issue date -- Date service order is entered into the system (not necessarily same as application date)

completion date -- Date on which service order is completed

order completion interval -- computed as order completion interval = completion date - issue date

Appendix D

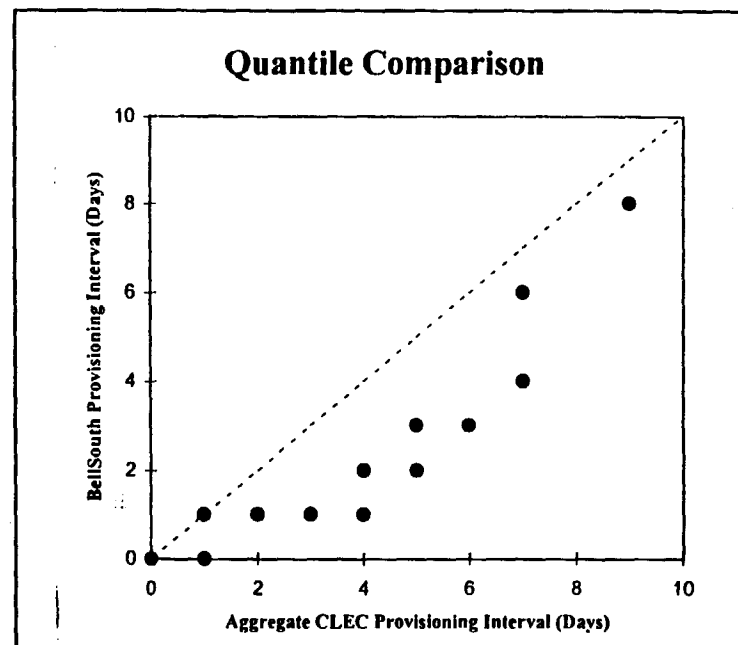
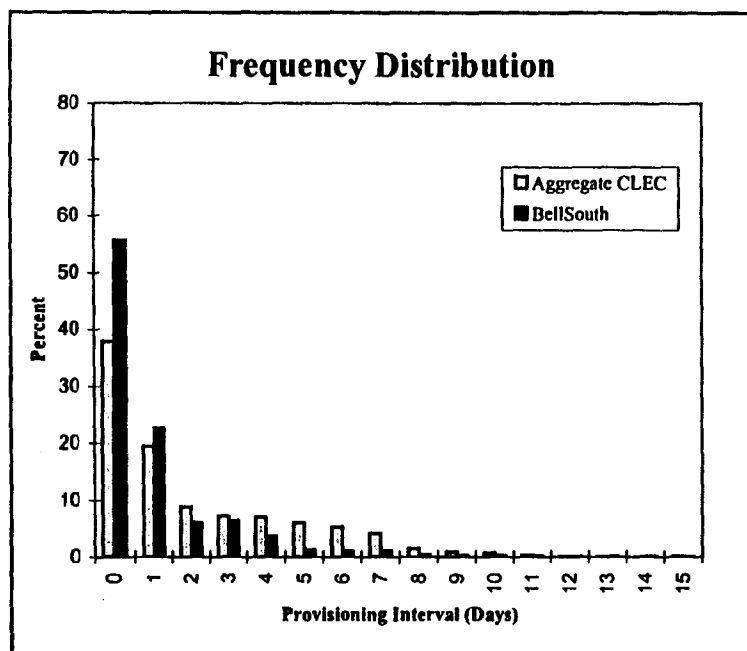
Order Completion Interval (OCI) - September Graphics

I. Graphical Representations

<u>Unadjusted</u>	<u>Adjusted</u>
1. All CasesD-1	1. All CasesD-2
2. Dispatch CasesD-3	2. Dispatch CasesD-4
3. Non-Dispatch Cases.....D-5	3. Non-Dispatch Cases.....D-6
4. Dispatched, Residential, All Circuits.....D-7	4. Dispatched, Residential, All Circuits.....D-8
5. Dispatched, Business, All CircuitsD-9	5. Dispatched, Business, All CircuitsD-10
6. Non-Dispatched, Residential, All CircuitsD-11	6. Non-Dispatched, Residential, All CircuitsD-12
7. Non-Dispatched, Business, All CircuitsD-13	7. Non-Dispatched, Business, All CircuitsD-14
8. Dispatched, Residential, Less Than 10 CircuitsD-15	8. Dispatched, Residential, Less Than 10 CircuitsD-16
9. Dispatched, Business, Less Than 10 Circuits.....D-17	9. Dispatched, Business, Less Than 10 CircuitsD-18
10. Non-Dispatched, Residential, Less Than 10 Circuits...D-19	10. Non-Dispatched, Residential, Less Than 10 CircuitsD-20
11. Non-Dispatched, Business, Less Than 10 Circuits.....D-21	11. Non-Dispatched, Business, Less Than 10 Circuits.....D-22

II. SQM.....	D-23
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Unadjusted September BellSouth and CLEC Completion Interval-Provisioning All Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BellSouth	1.20	2.80
CLEC Aggregate	2.20	2.85
Difference	-1.00	

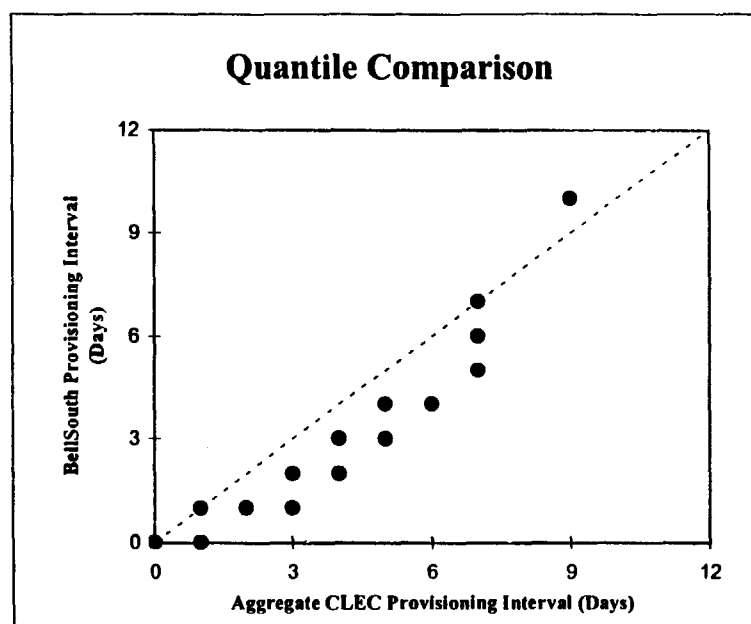
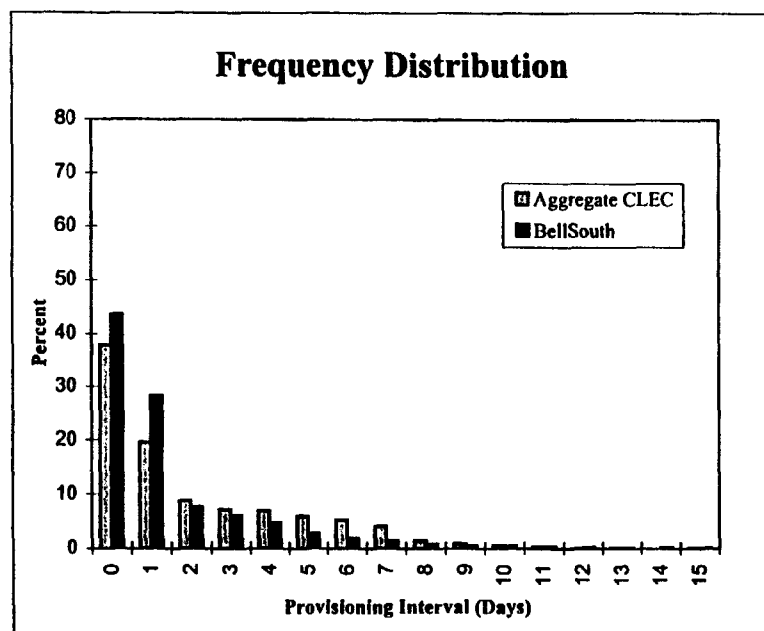
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-44.78	0.0000
FCC	-44.75	0.0000
BST	-15.14	0.0000

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted September BellSouth and CLEC Completion Interval-Provisioning All Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.61	3.00
CLEC	2.20	2.85
Difference	-0.59	

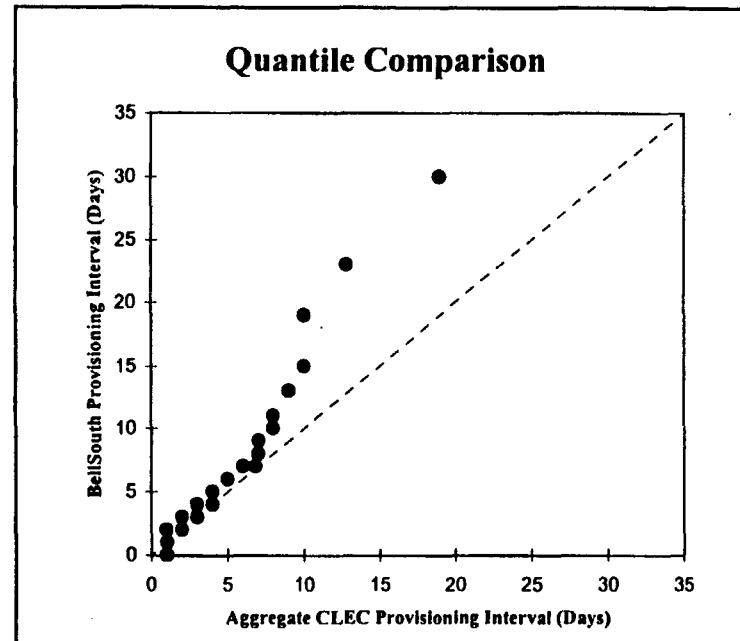
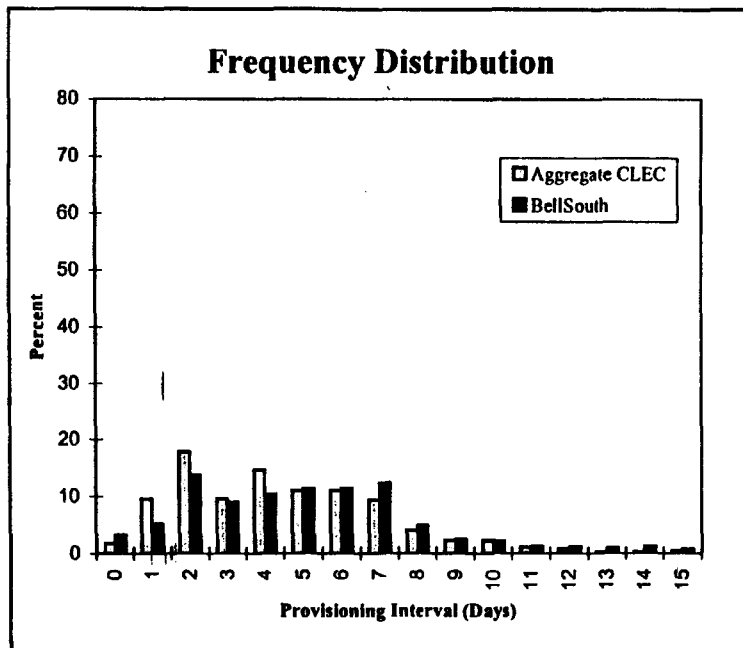
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-24.63	0.0000
FCC	-24.68	0.0000
BST	-8.81	0.0000

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted September BellSouth and CLEC Completion Interval-Provisioning Dispatched Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BellSouth	6.76	7.19
CLEC Aggregate	5.07	4.55
Difference	1.69	

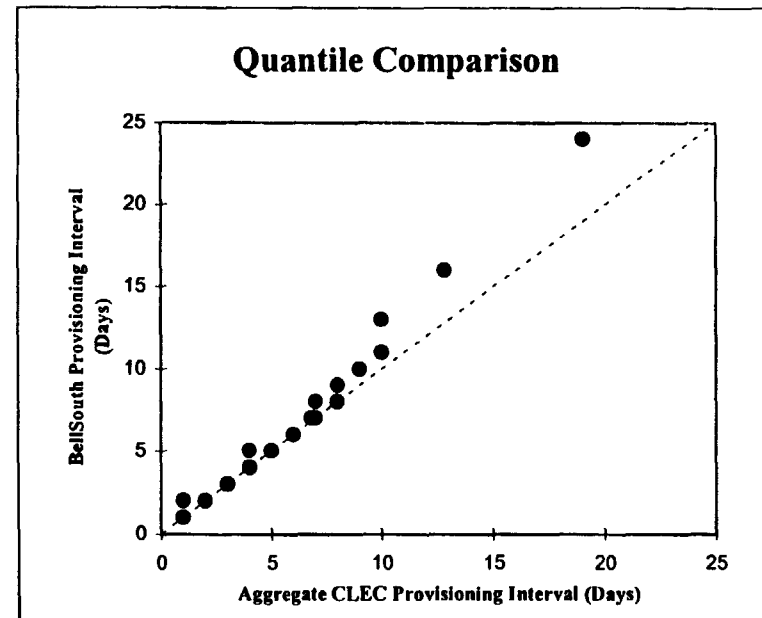
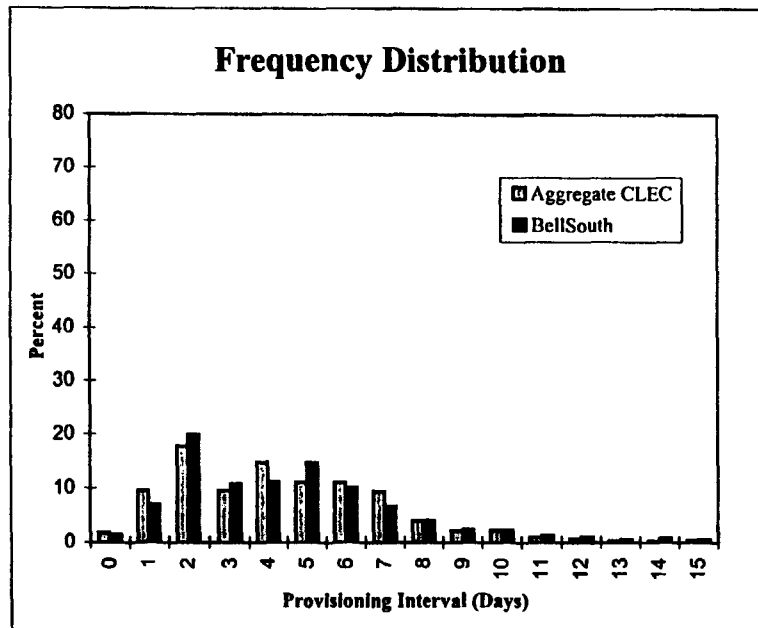
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	8.31	0.0000
FCC	8.46	0.0000
BST	5.85	0.0001

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted September BellSouth and CLEC Completion Interval-Provisioning Dispatched Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	5.52	5.59
CLEC	5.07	4.55
Difference	0.45	

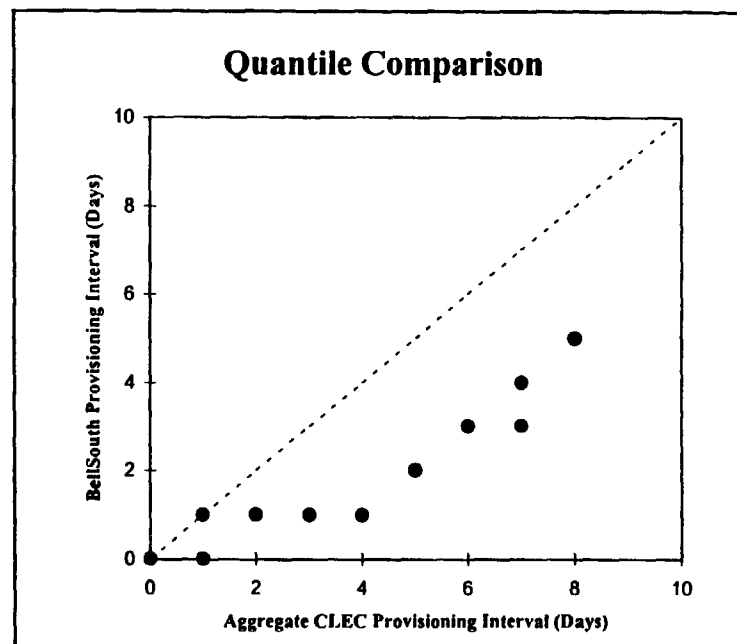
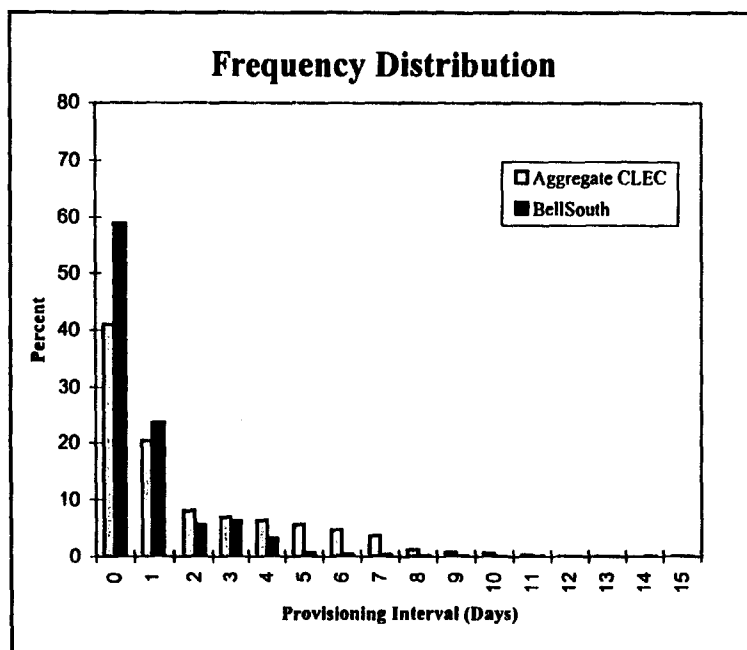
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	2.87	0.2065
FCC	2.90	0.1884
BST	2.57	0.7876

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted September BellSouth and CLEC Completion Interval-Provisioning Non-Dispatched Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BellSouth	0.86	1.75
CLEC Aggregate	1.95	2.50
Difference	-1.09	

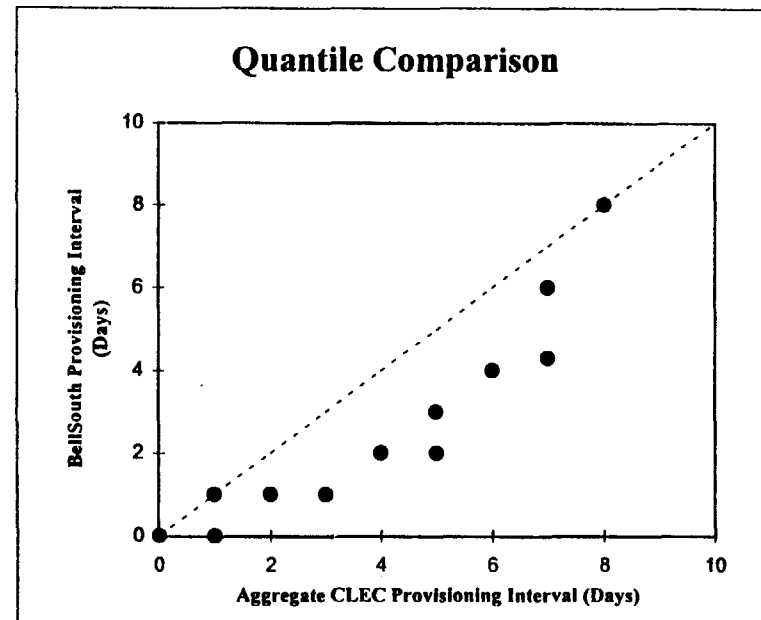
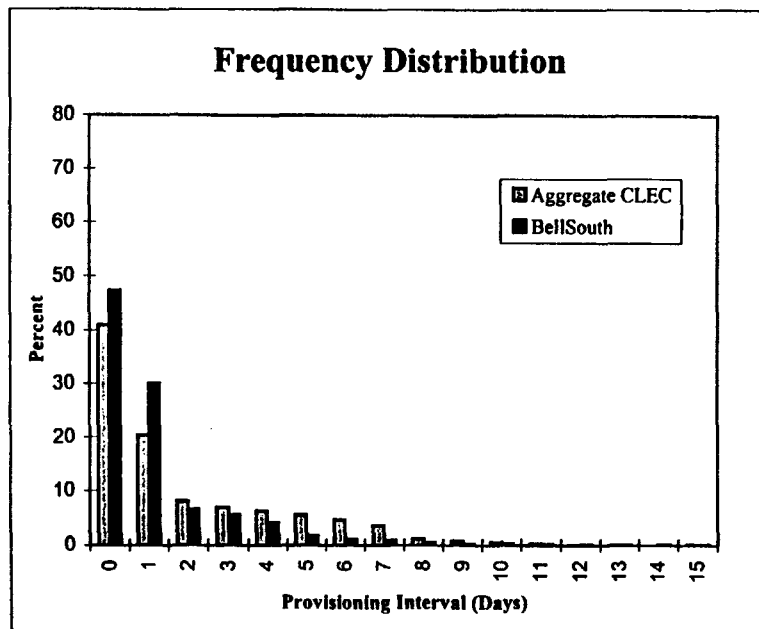
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-75.05	0.0000
FCC	-73.46	0.0000
BST	-17.15	0.0000

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted September BellSouth and CLEC Completion Interval-Provisioning Non-Dispatched Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.27	2.38
CLEC	1.95	2.50
Difference	-0.68	

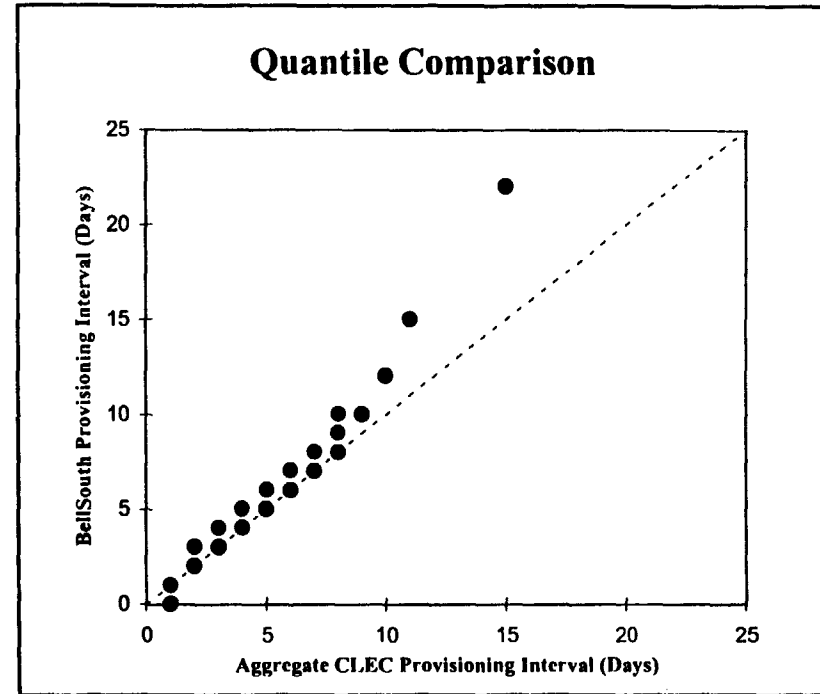
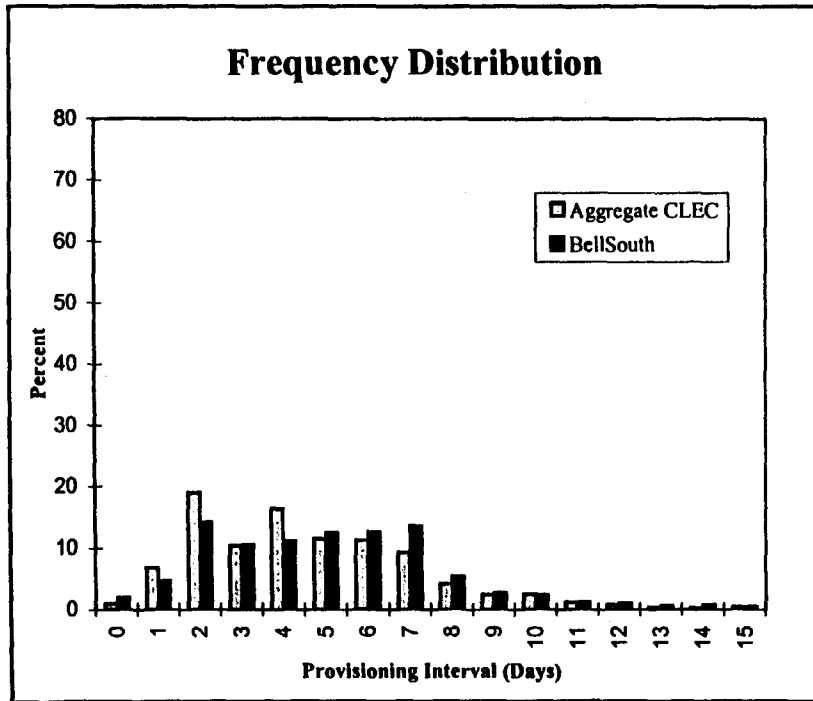
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-34.35	0.0000
FCC	-34.27	0.0000
BST	-9.93	0.0000

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted September BellSouth and CLEC Completion Interval-Provisioning Dispatched, Residential, All Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BellSouth	5.77	4.78
CLEC Aggregate	4.93	3.59
Difference	0.84	

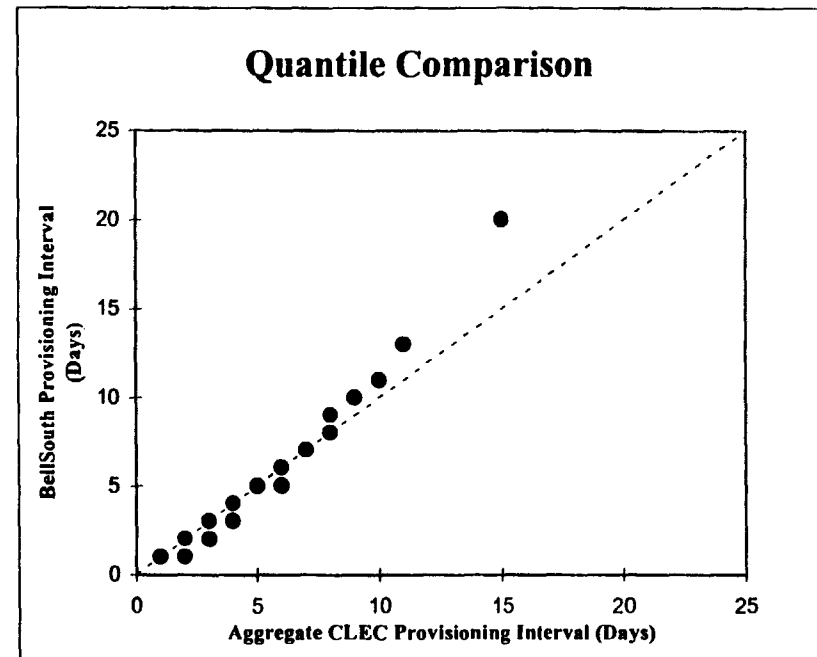
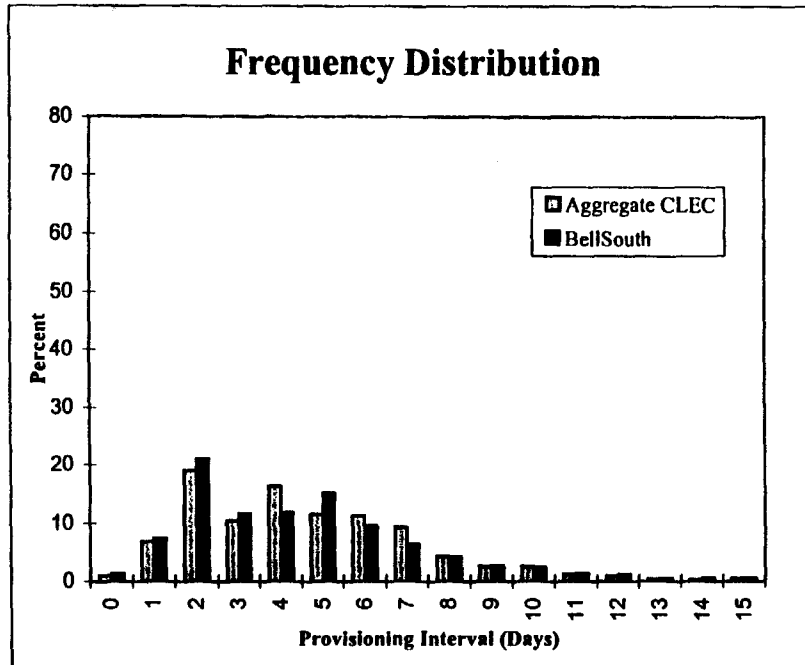
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	5.77	0.0000
FCC	5.86	0.0000
BST	5.41	0.0004

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted September BellSouth and CLEC Completion Interval-Provisioning Dispatched, Residential, All Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	5.05	4.48
CLEC	4.93	3.59
Difference	0.12	

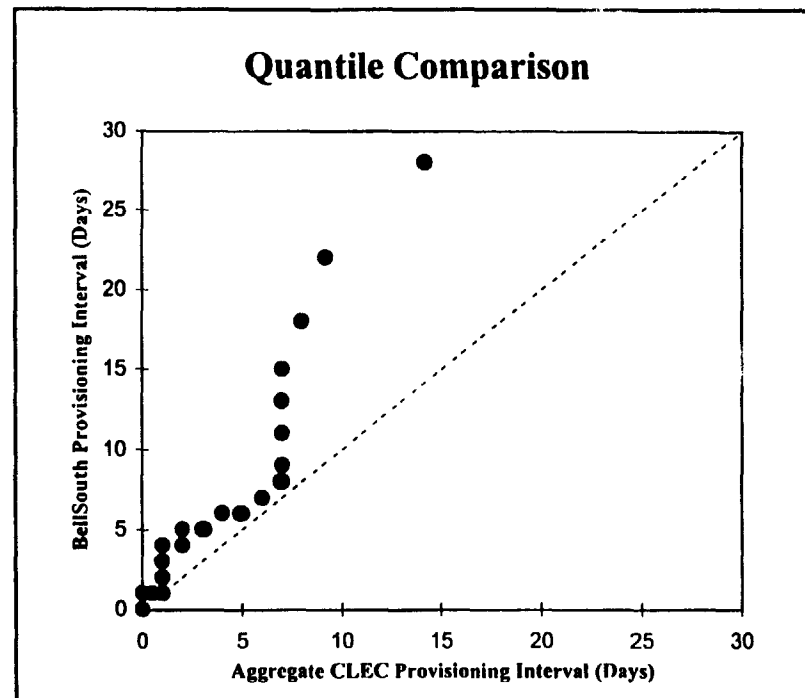
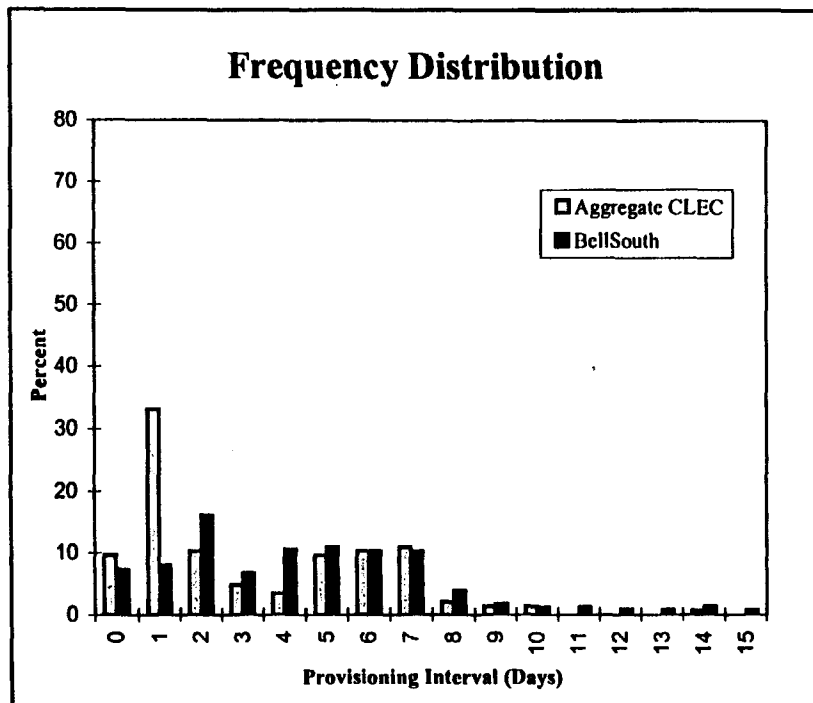
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	0.89	18.6182
FCC	0.90	18.3006
BST	0.78	22.0733

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted September BellSouth and CLEC Completion Interval-Provisioning Dispatched, Business, All Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BellSouth	6.11	7.14
CLEC Aggregate	3.75	4.39
Difference	2.36	

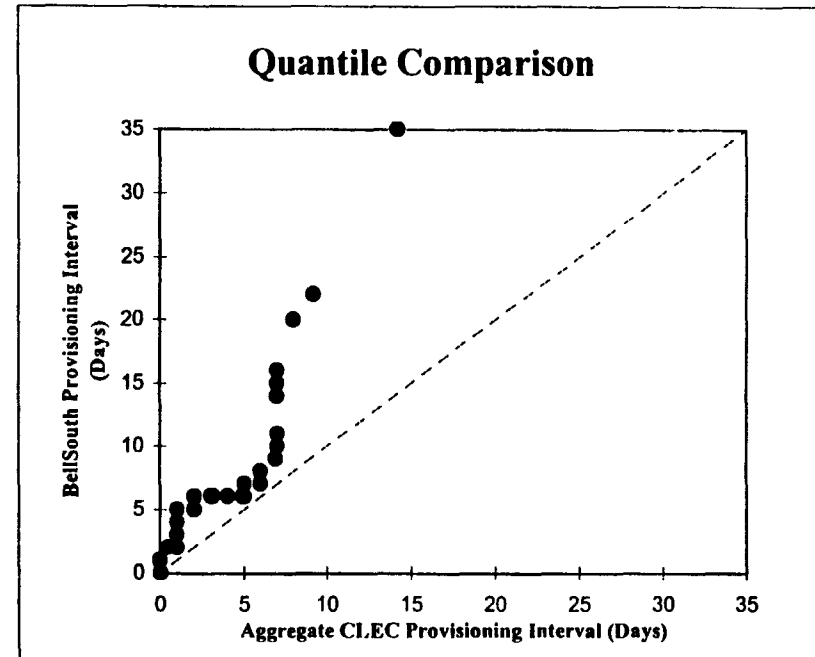
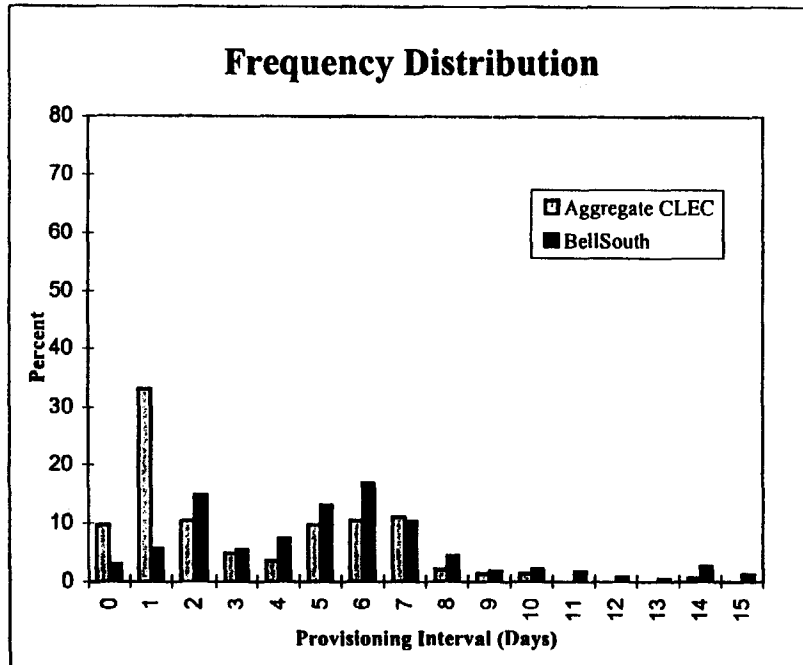
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	3.93	0.0042
FCC	3.97	0.0037
BST	1.55	6.7635

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted September BellSouth and CLEC Completion Interval-Provisioning Dispatched, Business, All Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	7.20	8.20
CLEC	3.75	4.39
Difference	3.45	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	5.00	0.0000
FCC	5.05	0.0000
BST	2.17	2.0650

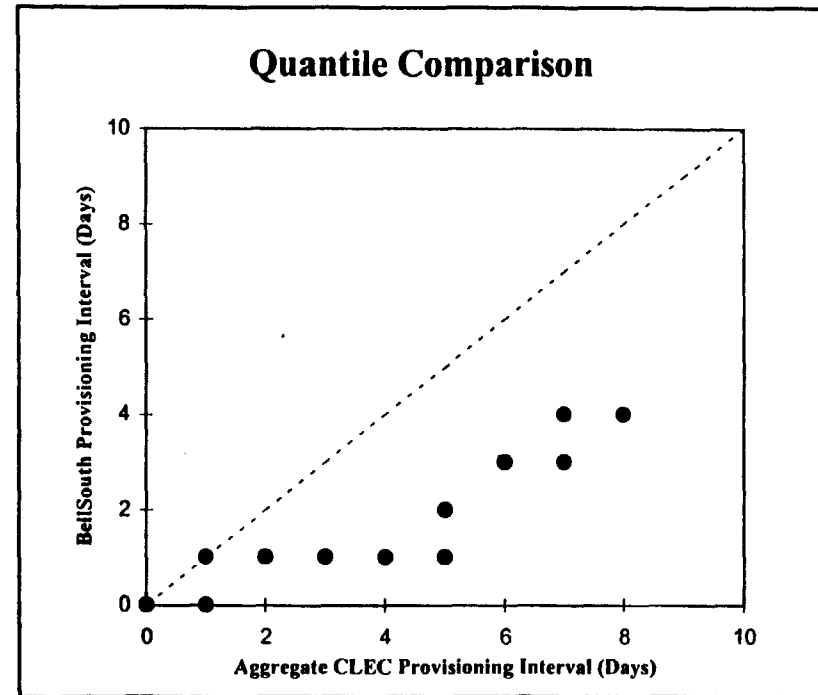
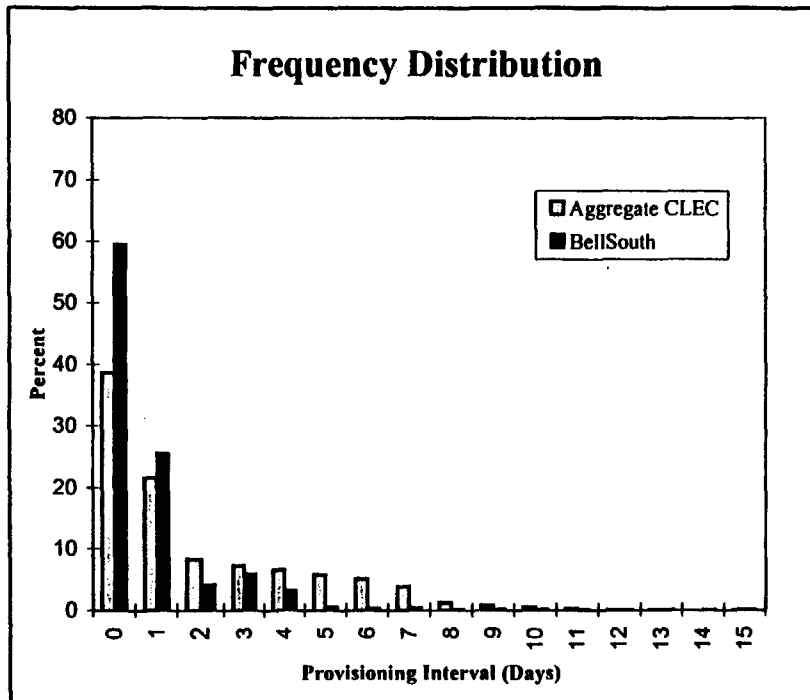
Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted

September BellSouth and CLEC Completion Interval-Provisioning

Non-Dispatched, Residential, All Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BellSouth	0.80	1.64
CLEC Aggregate	2.01	2.48
Difference	-1.21	

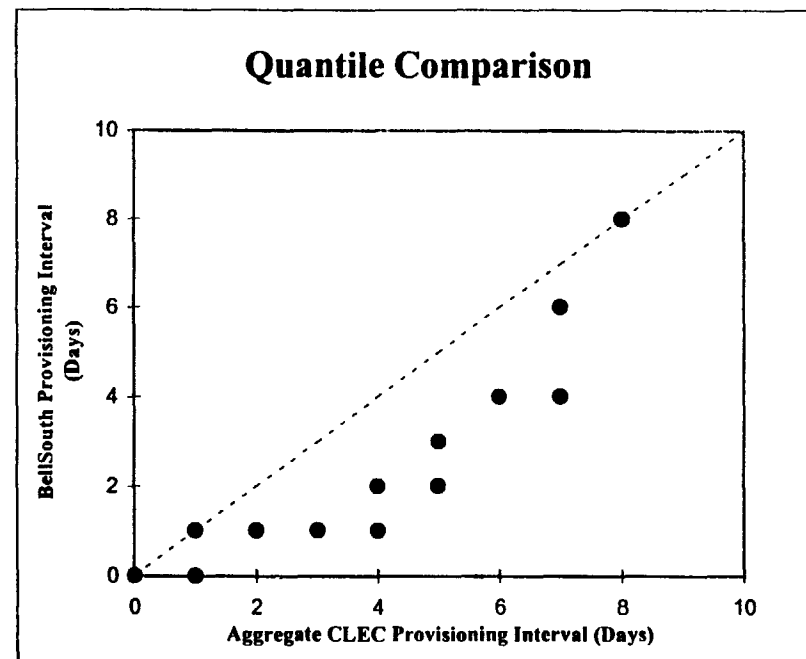
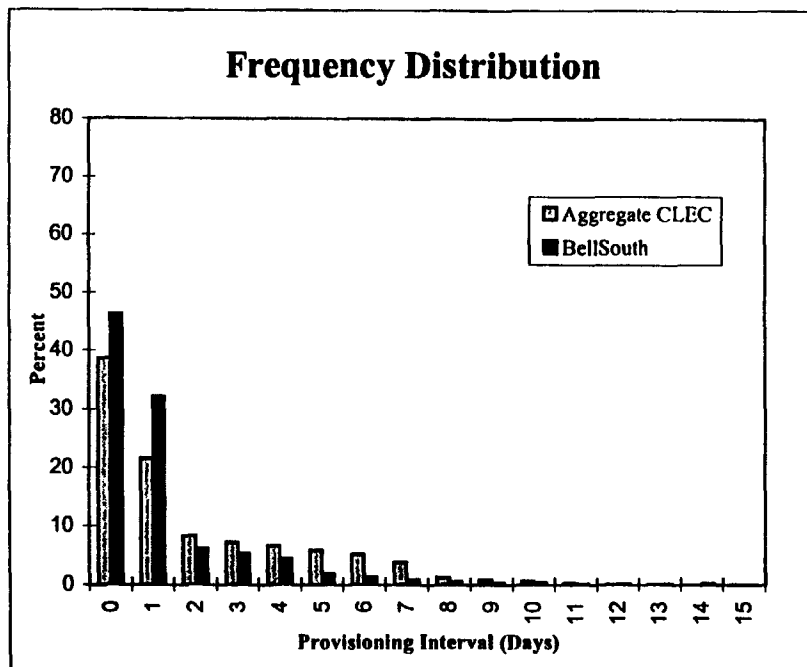
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-84.98	0.0000
FCC	-82.71	0.0000
BST	-18.25	0.0000

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted September BellSouth and CLEC Completion Interval-Provisioning Non-Dispatched, Residential, All Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.26	2.33
CLEC	2.01	2.48
Difference	-0.75	

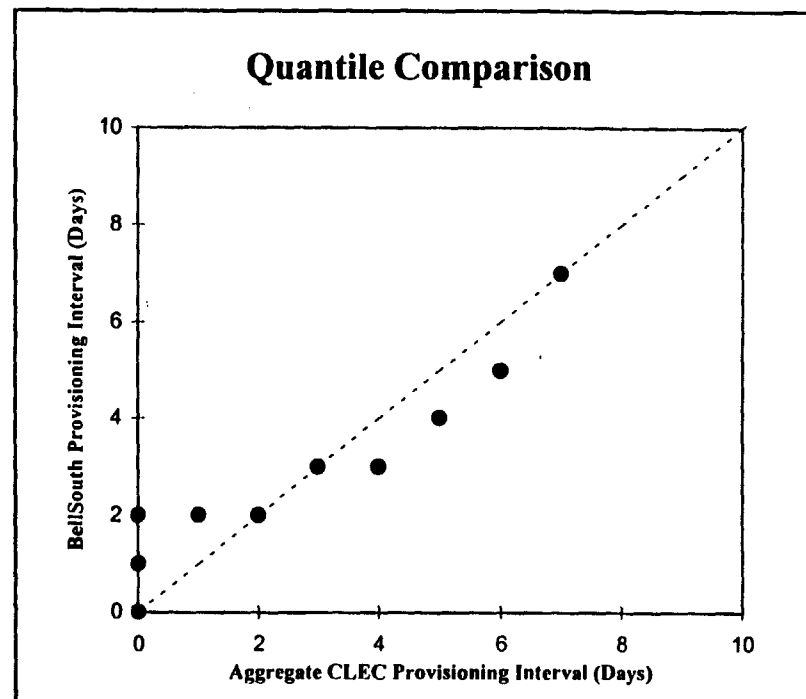
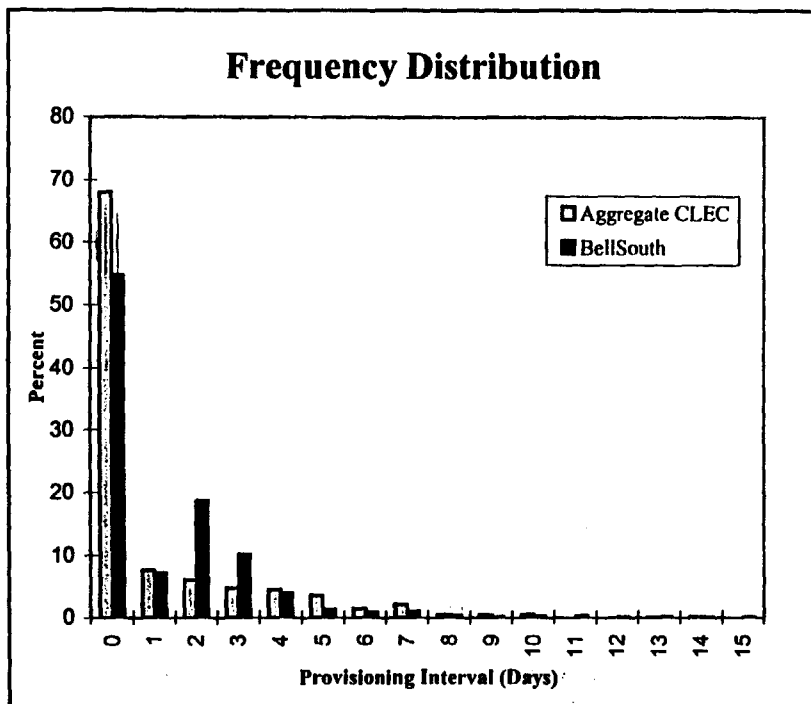
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-37.16	0.0000
FCC	-37.05	0.0000
BST	-11.75	0.0000

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted September BellSouth and CLEC Completion Interval-Provisioning Non-Dispatched, Business, All Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BellSouth	1.33	2.42
CLEC Aggregate	1.13	2.19
Difference	0.20	

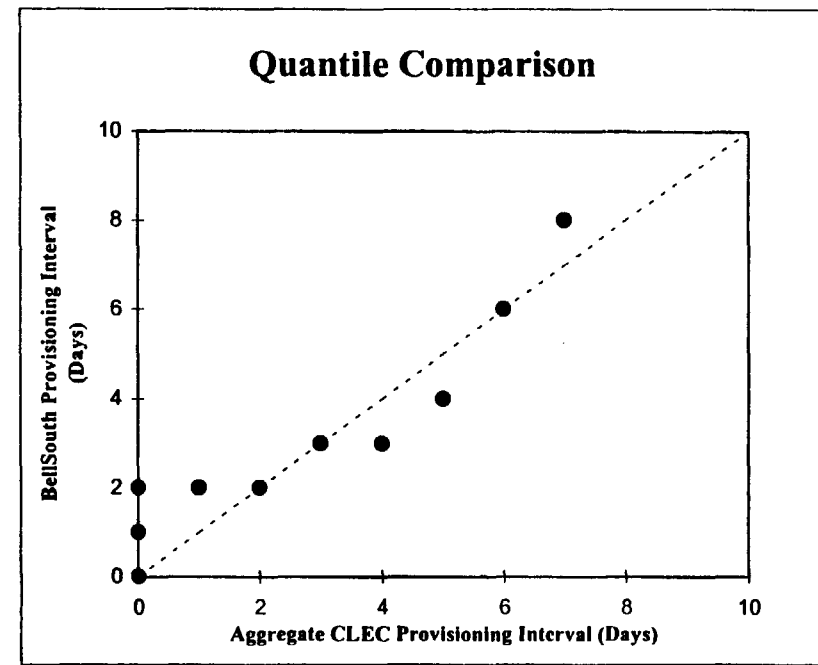
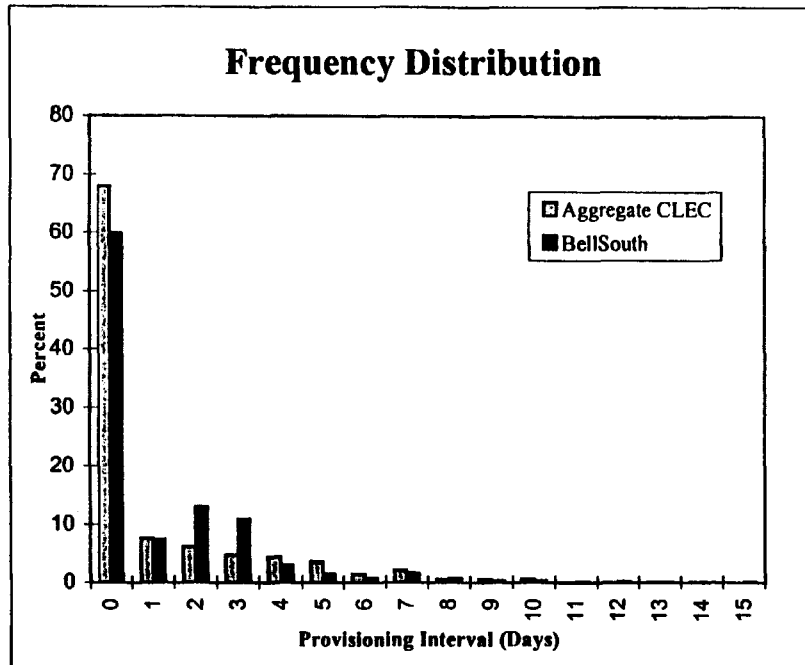
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	2.88	0.1962
FCC	2.89	0.1907
BST	0.70	24.5277

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted September BellSouth and CLEC Completion Interval-Provisioning Non-Dispatched, Business, All Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.27	2.47
CLEC	1.13	2.19
Difference	0.14	

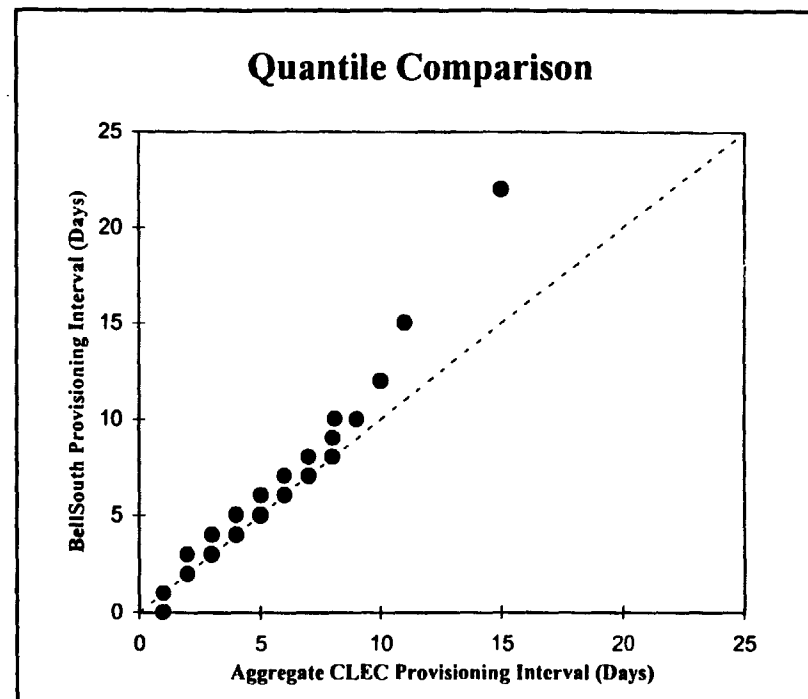
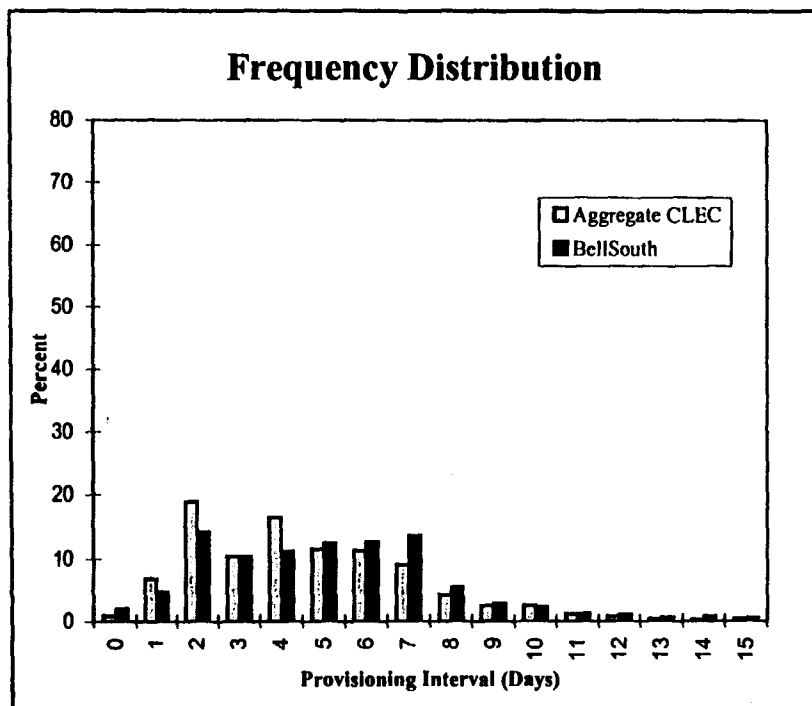
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	2.01	2.2195
FCC	2.02	2.1814
BST	0.49	31.4900

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted September BellSouth and CLEC Completion Interval-Provisioning Dispatched, Residential, Less Than 10 Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	5.76	4.78
CLEC	4.93	3.59
Difference	0.83	

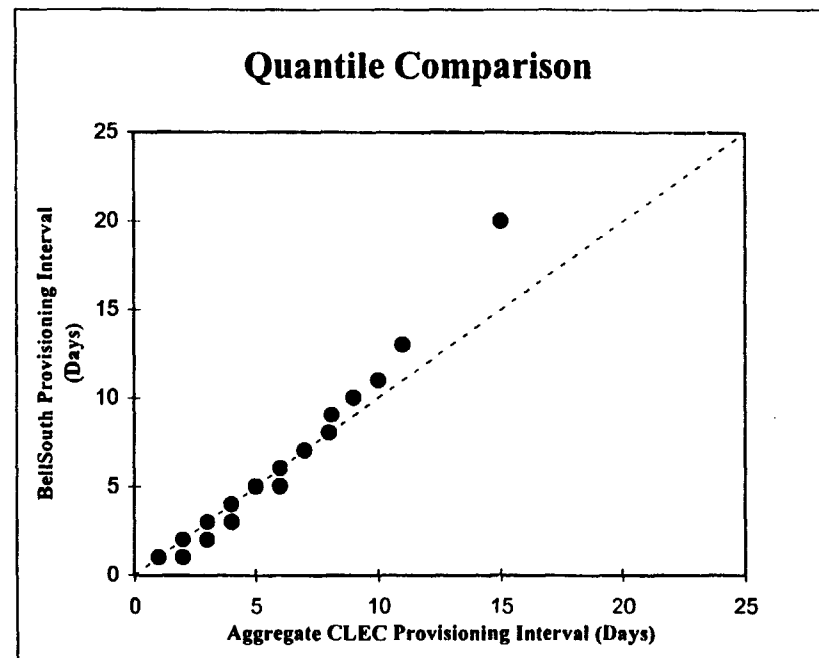
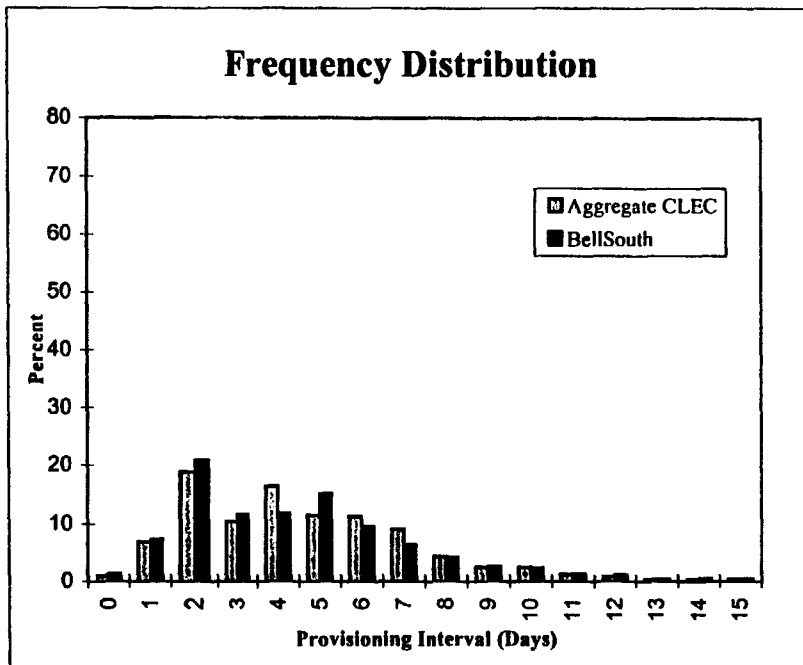
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	5.69	0.0000
FCC	5.79	0.0000
BST	5.43	0.0004

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted September BellSouth and CLEC Completion Interval-Provisioning Dispatched, Residential, Less Than 10 Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	5.05	4.48
CLEC	4.93	3.59
Difference	0.12	

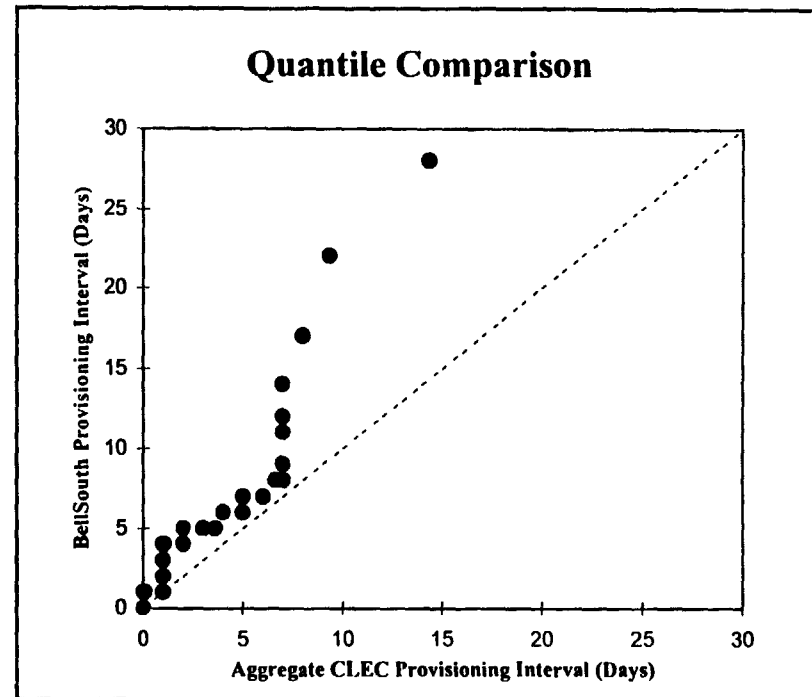
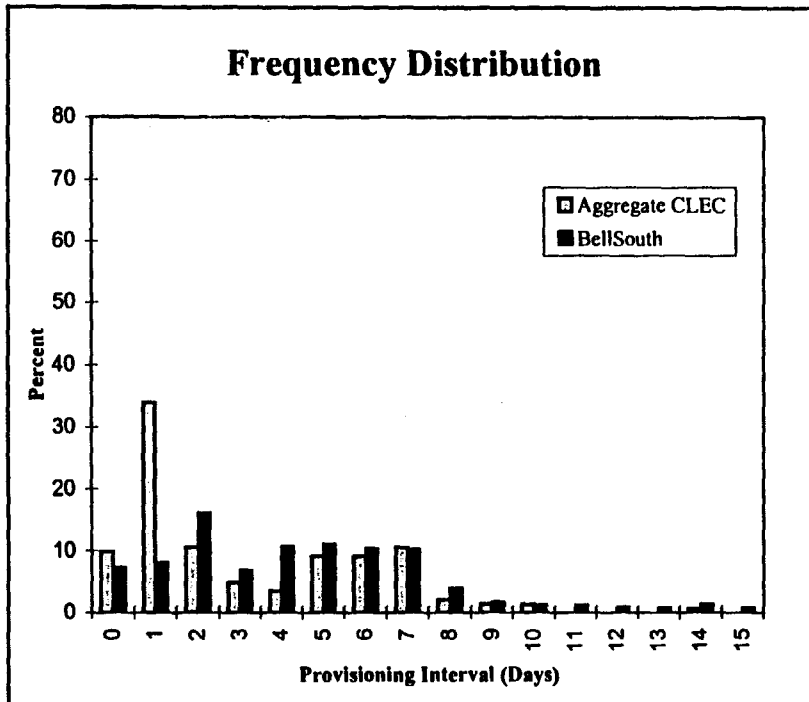
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	0.90	18.4376
FCC	0.91	18.1197
BST	0.78	22.0708

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted September BellSouth and CLEC Completion Interval-Provisioning Dispatched, Business, Less Than 10 Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BellSouth	6.01	6.83
CLEC Aggregate	3.69	4.43
Difference	2.32	

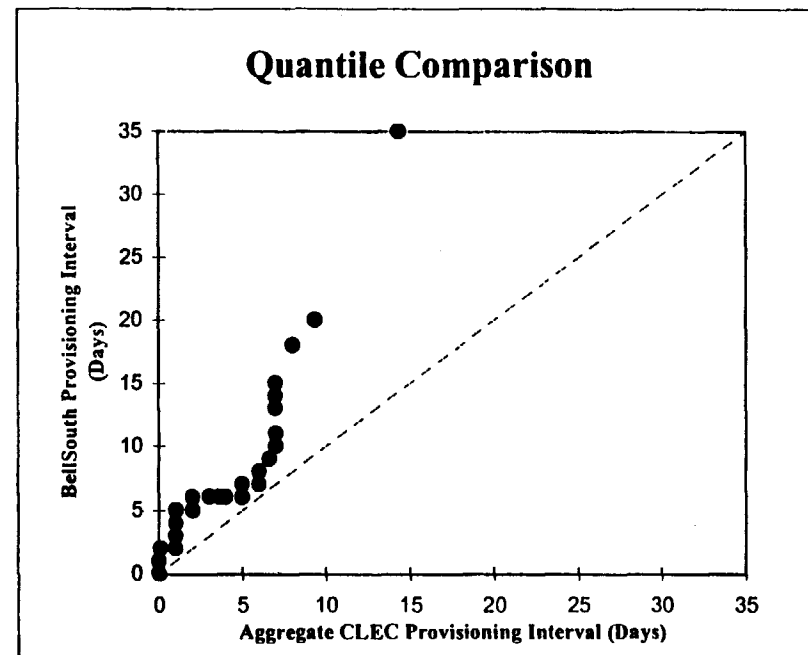
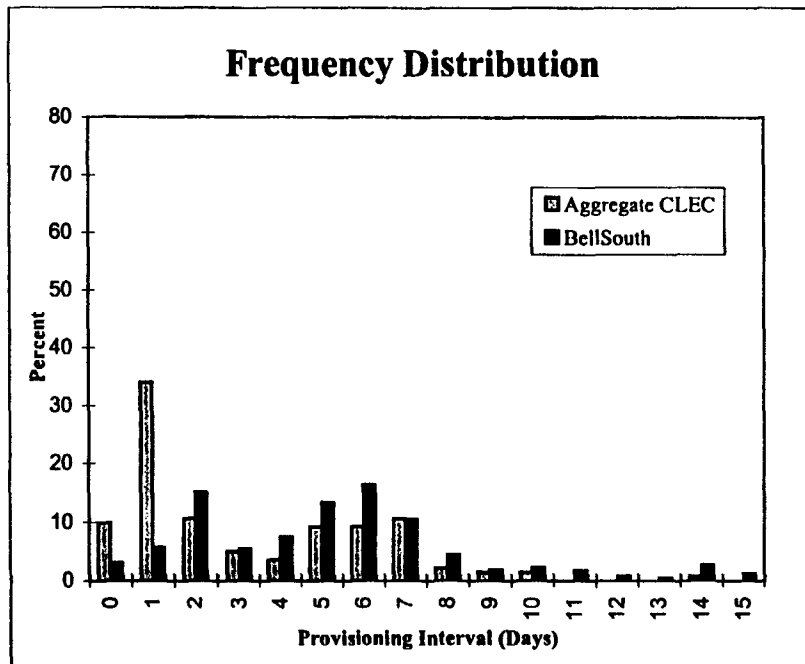
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	3.98	0.0035
FCC	4.01	0.0031
BST	1.51	7.2860

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted September BellSouth and CLEC Completion Interval-Provisioning Dispatched, Business, Less Than 10 Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	6.96	8.01
CLEC	3.69	4.43
Difference	3.27	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	4.78	0.0001
FCC	4.83	0.0001
BST	2.07	2.5419

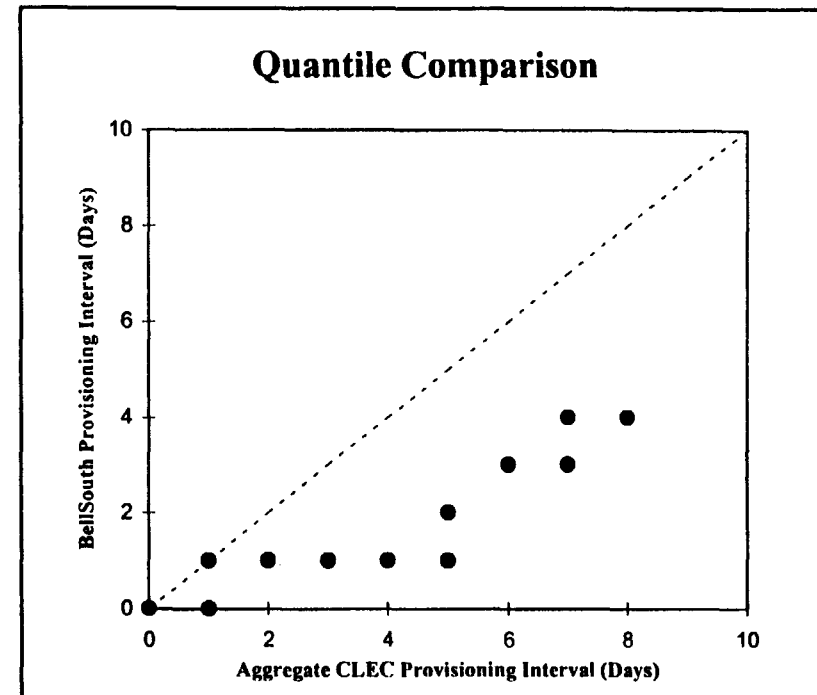
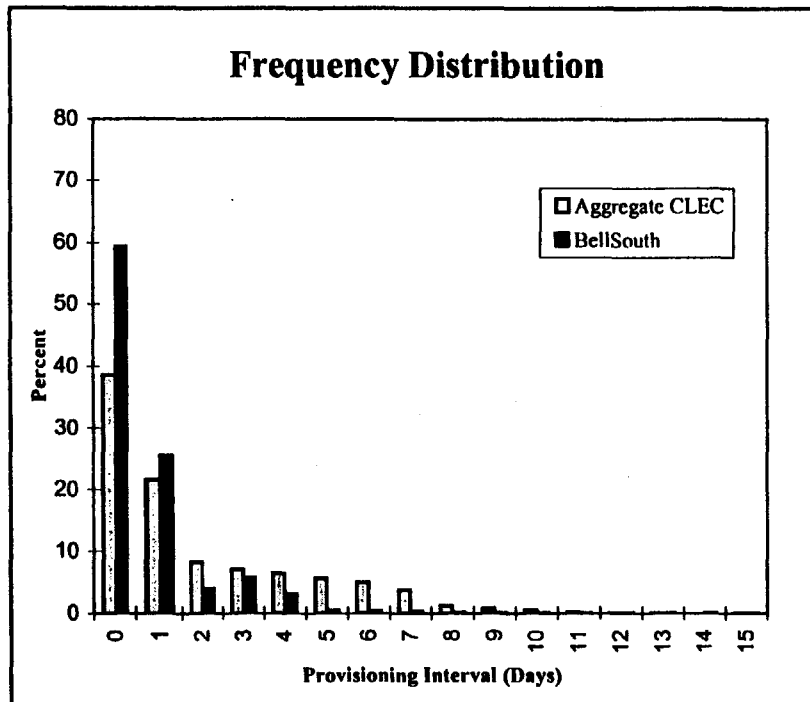
Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted

September BellSouth and CLEC Completion Interval-Provisioning

Non-Dispatched, Residential, Less Than 10 Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BellSouth	0.80	1.64
CLEC Aggregate	2.01	2.48
Difference	-1.21	

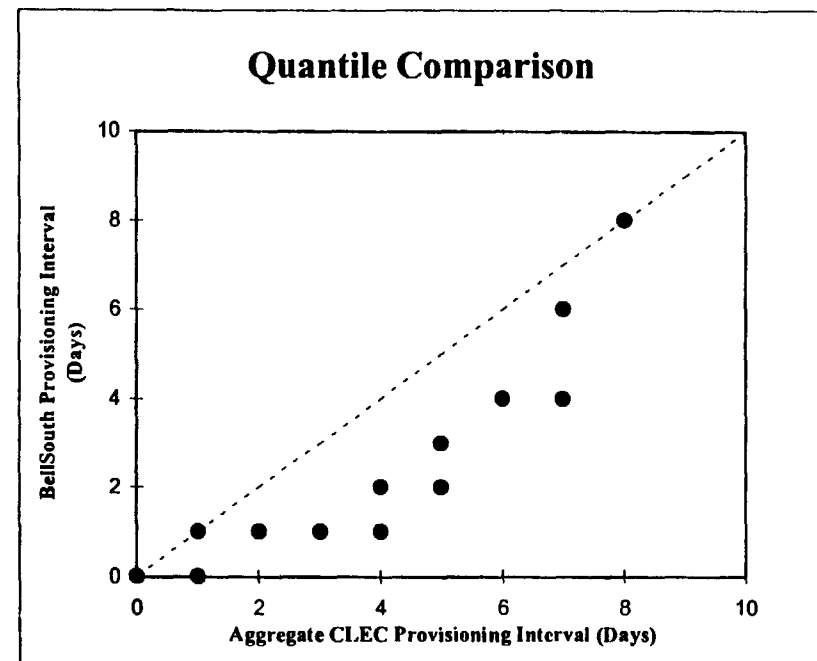
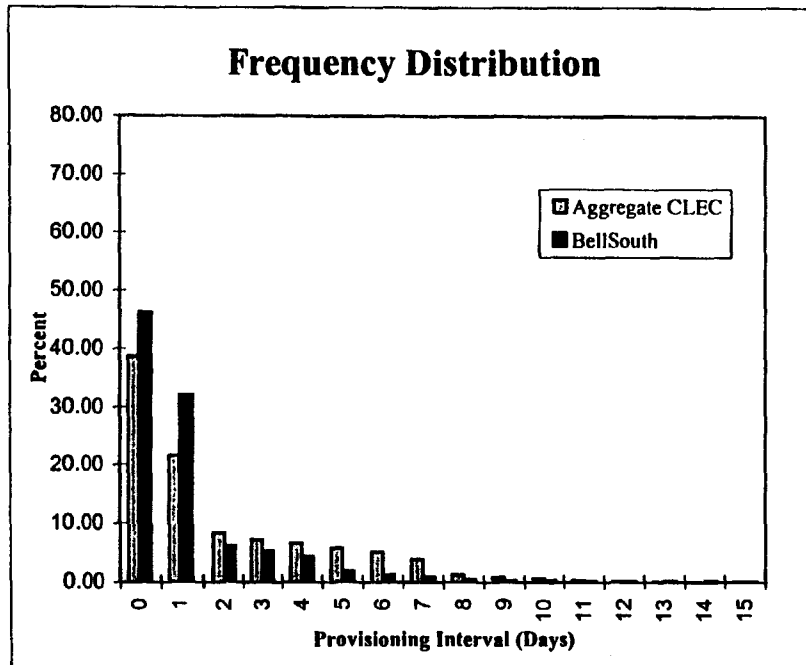
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-84.97	0.0000
FCC	-82.70	0.0000
BST	-18.25	0.0000

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted September BellSouth and CLEC Completion Interval-Provisioning Non-Dispatched, Residential, Less Than 10 Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.26	2.33
CLEC	2.01	2.48
Difference	-0.75	

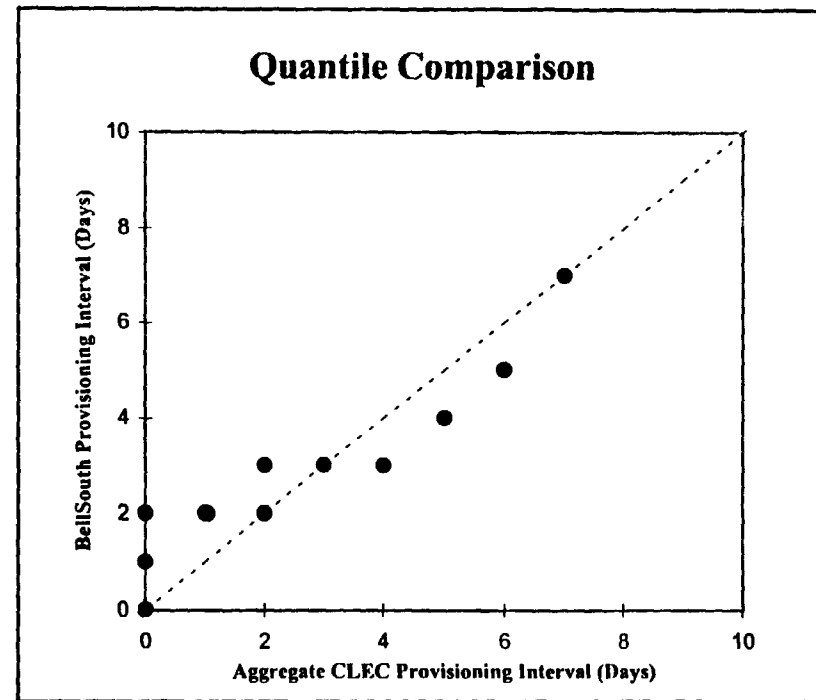
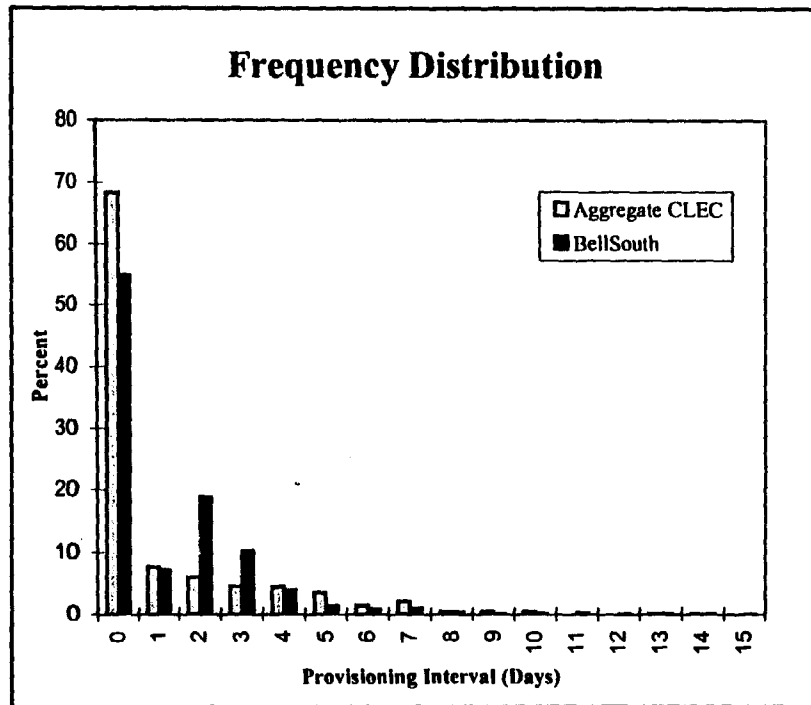
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-37.15	0.0000
FCC	-37.04	0.0000
BST	-11.75	0.0000

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted September BellSouth and CLEC Completion Interval-Provisioning Non-Dispatched, Business, Less Than 10 Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BellSouth	1.33	2.42
CLEC Aggregate	1.12	2.19
Difference	0.21	

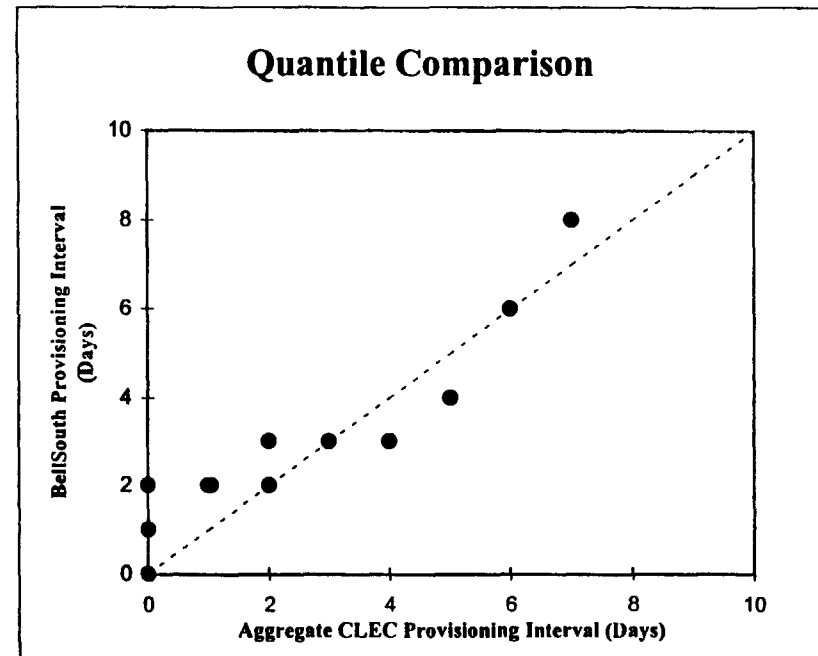
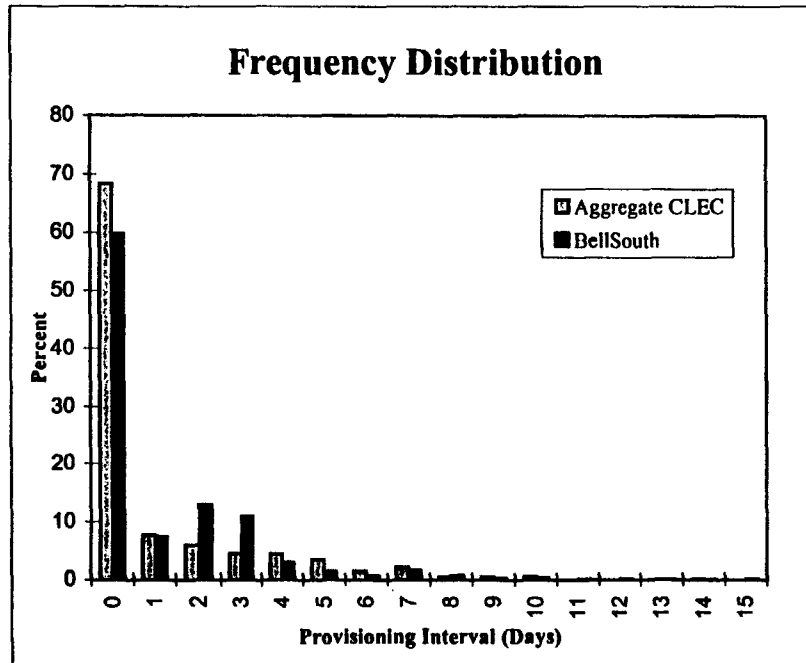
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	3.00	0.1353
FCC	3.01	0.1313
BST	0.72	23.7394

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted September BellSouth and CLEC Completion Interval-Provisioning Non-Dispatched, Business, Less Than 10 Circuits



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.27	2.47
CLEC	1.12	2.19
Difference	0.15	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	2.15	1.5811
FCC	2.16	1.5505
BST	0.52	30.3765

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

SQM: Order Completion Interval

SEPTEMBER

DISPATCH																
SAME DAY		1 DAY		2 DAYS		3 DAYS		4 DAYS		5 DAYS		> 5 DAYS		AVG. (DAYS)		
< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	
CLEC 1																
LOUISIANA																
CLEC AGGREGATE																
LOUISIANA																
- RESALE RESIDENCE	0.96%	0.00%	6.75%	0.00%	18.33%	50.00%	10.37%	0.00%	15.92%	0.00%	11.33%	0.00%	36.33%	50.00%	5.18	4.50
- RESALE BUSINESS	9.70%	0.00%	29.09%	0.00%	10.91%	0.00%	6.06%	0.00%	5.45%	0.00%	9.70%	40.00%	29.09%	60.00%	3.99	5.80
- UNE LOOPS WITH LNP																
BST																
LOUISIANA																
- RETAIL RESIDENCE	2.46%	2.15%	4.73%	4.30%	12.95%	10.75%	9.98%	16.13%	10.48%	6.45%	11.61%	16.13%	47.79%	44.09%	6.46	6.66
- RETAIL BUSINESS	6.71%	6.12%	7.49%	4.76%	14.41%	8.16%	6.44%	4.76%	9.96%	3.40%	9.99%	4.08%	45.00%	68.71%	8.07	14.63

DISPATCH																
0-5 DAYS		6-10 DAYS		11-15 DAYS		16-20 DAYS		21-25 DAYS		26-30 DAYS		> 30 DAYS		AVG. (DAYS)		
< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	
CLEC 1																
LOUISIANA																
CLEC AGGREGATE																
LOUISIANA																
- RESALE DESIGN	3.28%	0.00%	29.51%	0.00%	13.11%	0.00%	13.11%	0.00%	16.39%	0.00%	6.56%	0.00%	18.03%	0.00%	19.07	0.00
- UNE DESIGN	6.25%	0.00%	50.00%	0.00%	29.69%	0.00%	7.81%	0.00%	3.13%	0.00%	1.56%	0.00%	1.56%	0.00%	10.97	0.00
- UNE NON-DESIGN	28.13%	0.00%	45.31%	0.00%	18.75%	0.00%	3.13%	0.00%	1.56%	0.00%	3.13%	0.00%	0.00%	0.00%	8.73	0.00
BST																
LOUISIANA																
- RETAIL DESIGN	10.33%	66.67%	15.38%	11.11%	16.18%	0.00%	10.46%	0.00%	14.55%	11.11%	8.92%	0.00%	24.18%	11.11%	23.67	10.11

Definitions

Issue date -- Date service order is entered into the system (not necessarily same as application date)

completion date -- Date on which service order is completed

order completion interval -- computed as order completion interval = completion date - Issue date

SQM: Order Completion Interval

SEPTEMBER

NO DISPATCH																
SAME DAY		1 DAY		2 DAYS		3 DAYS		4 DAYS		5 DAYS		> 5 DAYS		AVG. (DAYS)		
< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	
CLEC 1																
LOUISIANA																
CLEC AGGREGATE																
LOUISIANA																
- RESALE RESIDENCE	38.45%	0.00%	21.68%	0.00%	8.47%	0.00%	7.24%	0.00%	6.54%	0.00%	5.73%	100.00%	11.90%	0.00%	2.01	5.00
- RESALE BUSINESS	64.94%	0.00%	8.38%	0.00%	7.93%	42.86%	4.95%	42.86%	4.57%	0.00%	3.66%	14.29%	5.56%	0.00%	1.20	2.86
- UNE LOOPS WITH LNP																
BSI																
LOUISIANA																
- RETAIL RESIDENCE	59.13%	0.00%	25.51%	0.00%	4.14%	0.00%	5.89%	0.00%	3.21%	0.00%	0.59%	0.00%	1.53%	0.00%	0.83	0.00
- RETAIL BUSINESS	64.66%	53.54%	7.39%	16.54%	18.50%	10.24%	10.10%	0.79%	3.96%	3.94%	1.37%	4.72%	3.82%	10.24%	1.39	1.77

NO DISPATCH																
0-5 DAYS		6-10 DAYS		11-15 DAYS		16-20 DAYS		21-25 DAYS		26-30 DAYS		> 30 DAYS		AVG. (DAYS)		
< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	< 10 Ckts	>= 10 Ckts	
CLEC 1																
LOUISIANA																
CLEC AGGREGATE																
LOUISIANA																
- RESALE DESIGN	76.92%	0.00%	7.69%	0.00%	9.62%	0.00%	0.00%	0.00%	3.85%	0.00%	1.92%	0.00%	0.00%	0.00%	5.83	0.00
- UNE DESIGN	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00	0.00
- UNE NON-DESIGN	93.94%	0.00%	3.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.03%	0.00%	1.97	0.00
BSI																
LOUISIANA																
- RETAIL DESIGN	25.49%	0.00%	23.53%	0.00%	28.76%	0.00%	0.85%	0.00%	4.58%	0.00%	3.92%	0.00%	13.07%	0.00%	14.46	0.00

Definitions

issue date -- Date service order is entered into the system (not necessarily same as application date)

completion date -- Date on which service order is completed

order completion interval -- computed as order completion interval = completion date - issue date

Appendix E
Maintenance Average Duration (MAD) - August Graphics

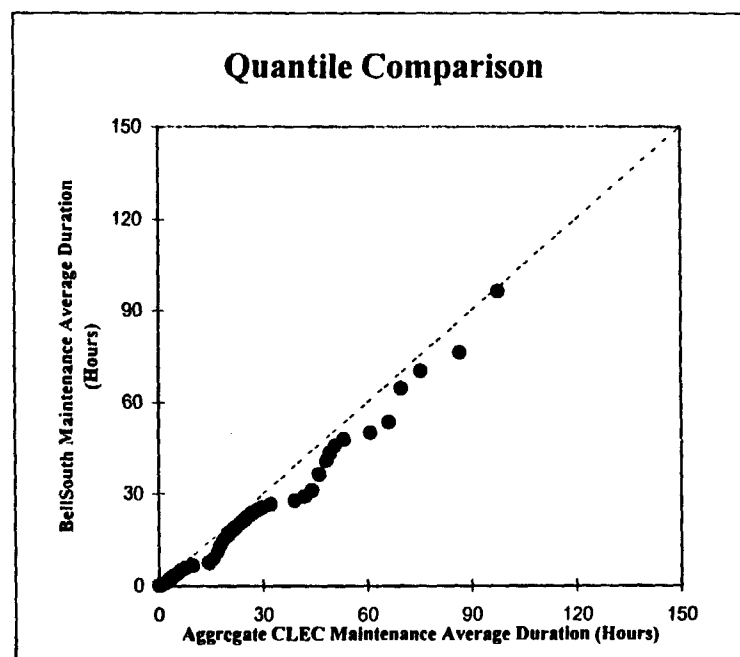
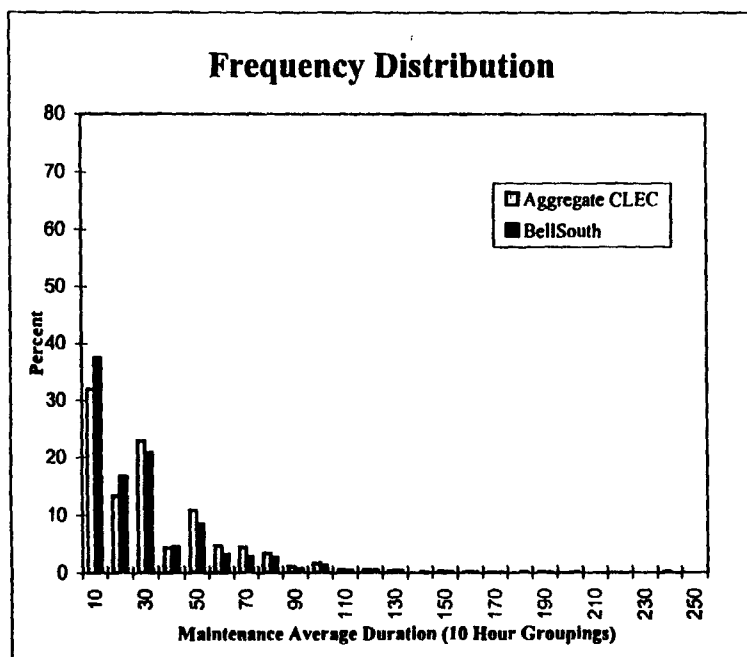
I. Graphical Representations

<u>Unadjusted</u>	
1. All Cases	E-1
2. Dispatched	E-3
3. Non-Dispatched	E-5
4. Dispatched, Residential	E-7
5. Dispatched, Business	E-9
6. Non-Dispatched, Residential	E-11
7. Non-Dispatched, Business	E-13

<u>Adjusted</u>	
1. All Cases	E-2
2. Dispatched	E-4
3. Non-Dispatched	E-6
4. Dispatched, Residential	E-8
5. Dispatched, Business	E-10
6. Non-Dispatched, Residential	E-12
7. Non-Dispatched, Business	E-14

II. SQM.....	E-15
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Unadjusted August BellSouth and CLEC Average Duration-Maintenance Non-Designed, All Cases



Descriptive Measures

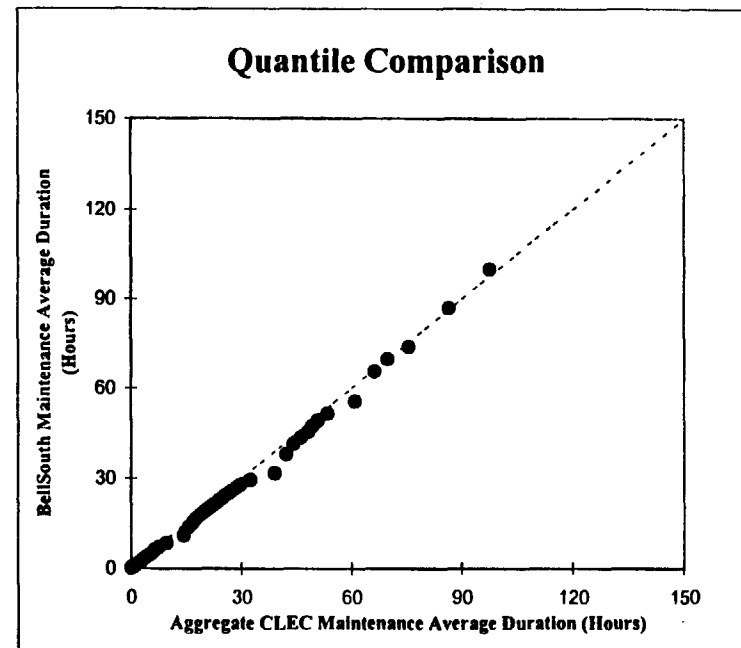
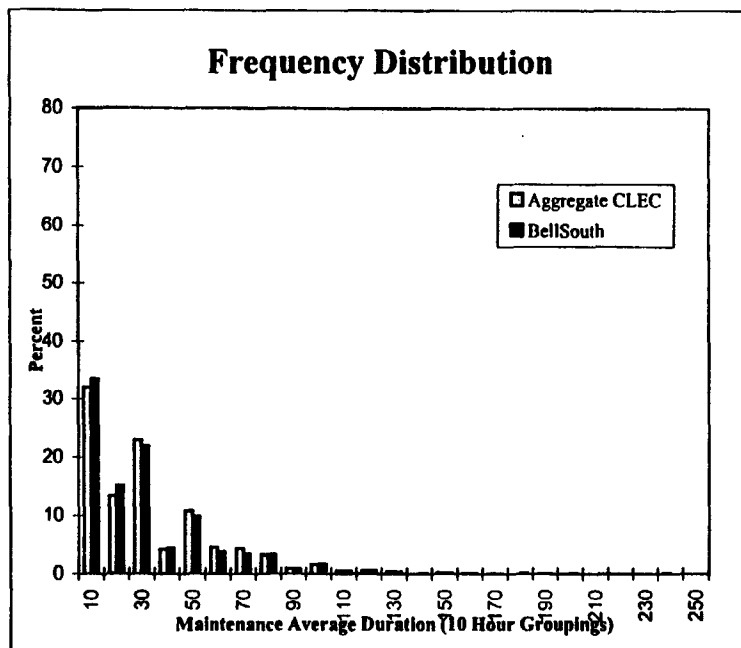
Service Provider	Mean	Standard Deviation
BST	23.45	25.18
CLEC	27.89	27.48
Difference	-4.44	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-6.62	0.0000
FCC	-6.61	0.0000
BST	-4.30	0.0089

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted August BellSouth and CLEC Average Duration-Maintenance Non-Designed, All Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	26.51	27.05
CLEC	27.89	27.48
Difference	-1.38	

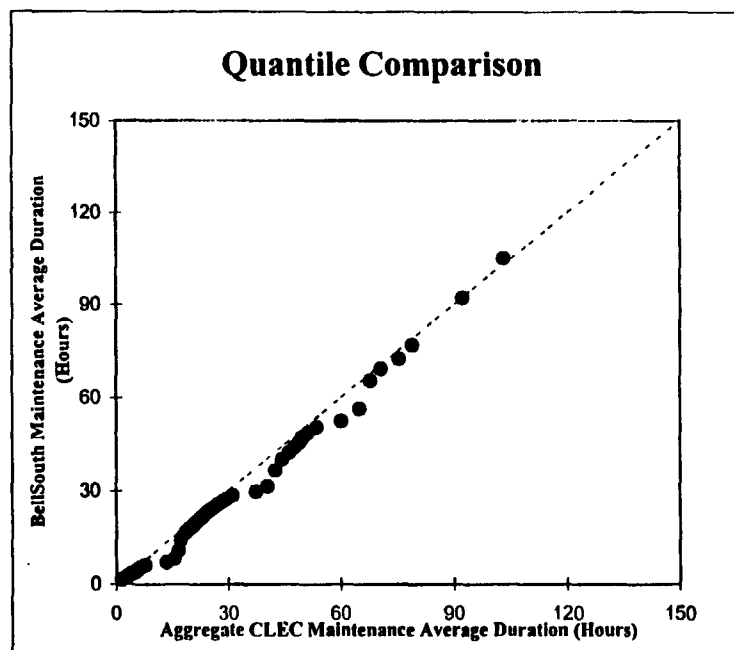
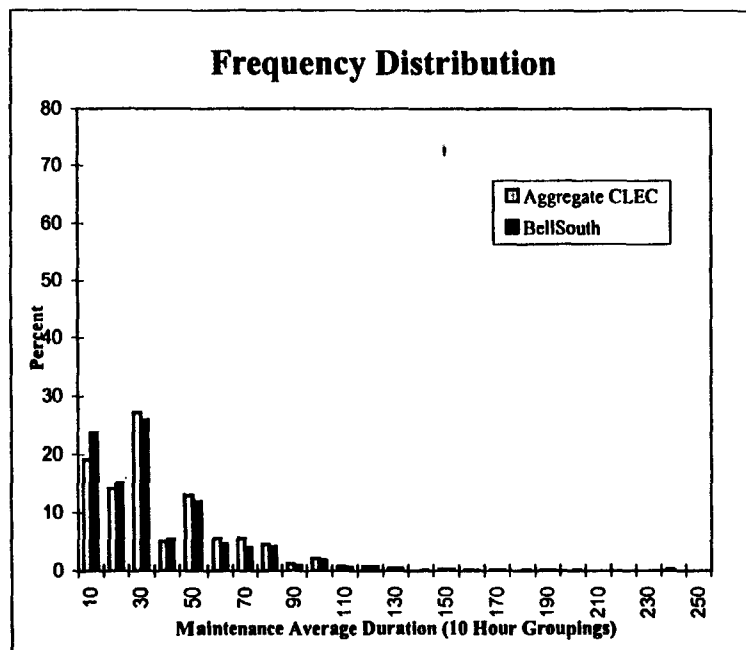
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-1.91	2.7770
FCC	-1.91	2.7809
BST	-1.93	3.1656

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted

August BellSouth and CLEC Average Duration-Maintenance Non-Designed, Dispatched



Descriptive Measures

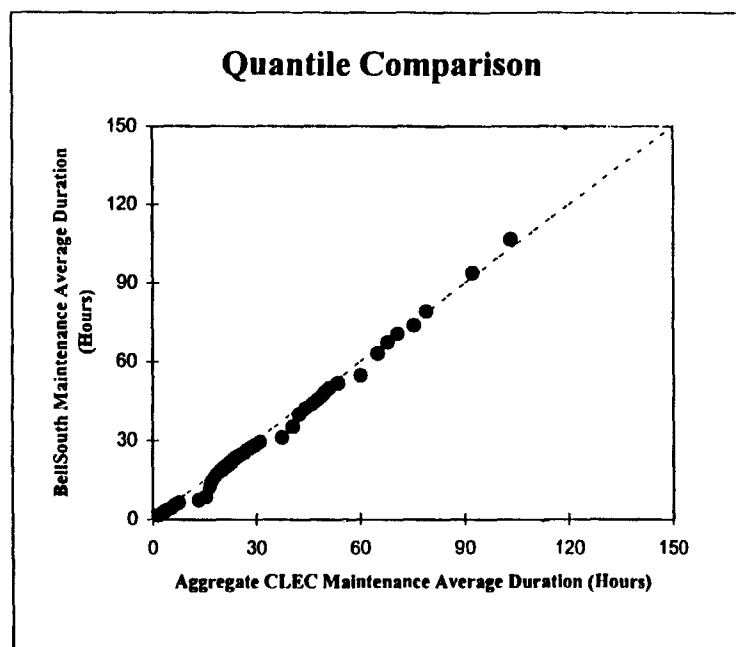
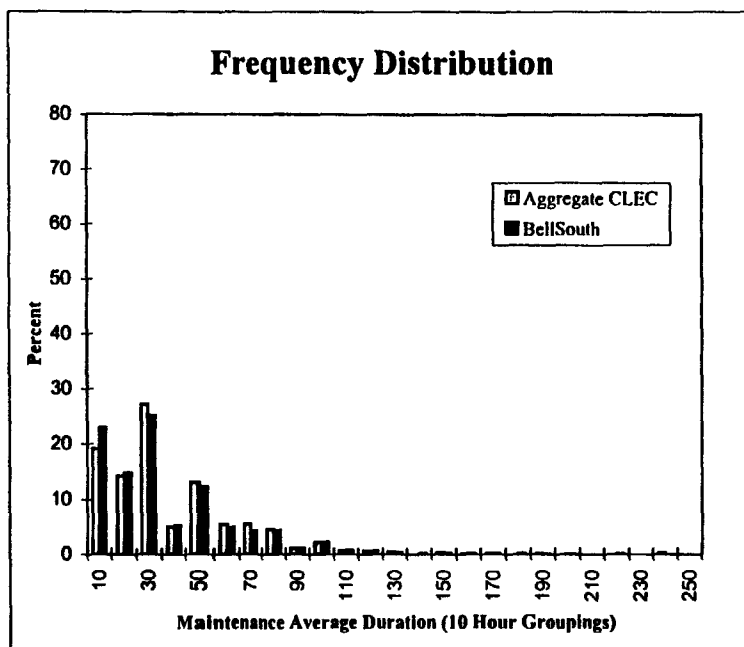
Service Provider	Mean	Standard Deviation
BST	31.01	27.49
CLEC	33.95	28.35
Difference	-2.94	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-3.43	0.0297
FCC	-3.43	0.0300
BST	-2.39	1.1656

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted August BellSouth and CLEC Average Duration-Maintenance Non-Designed, Dispatched



Descriptive Measures

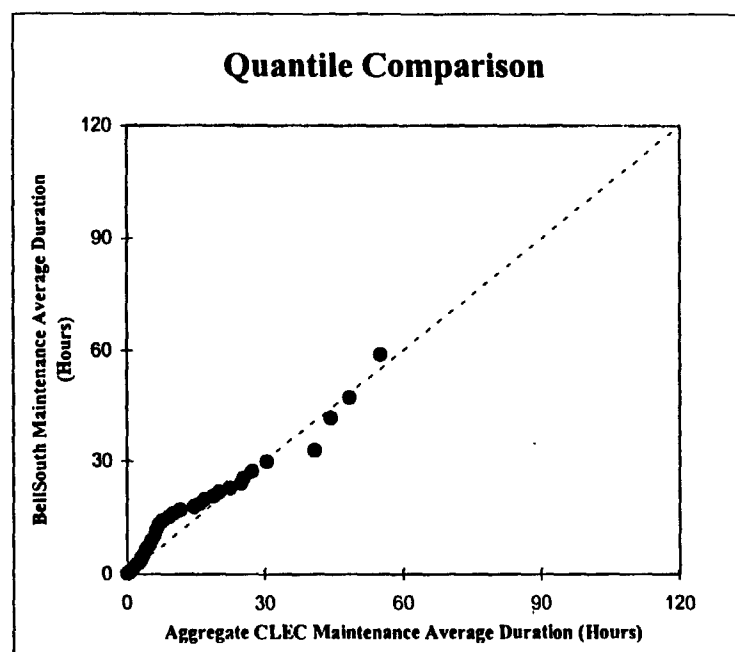
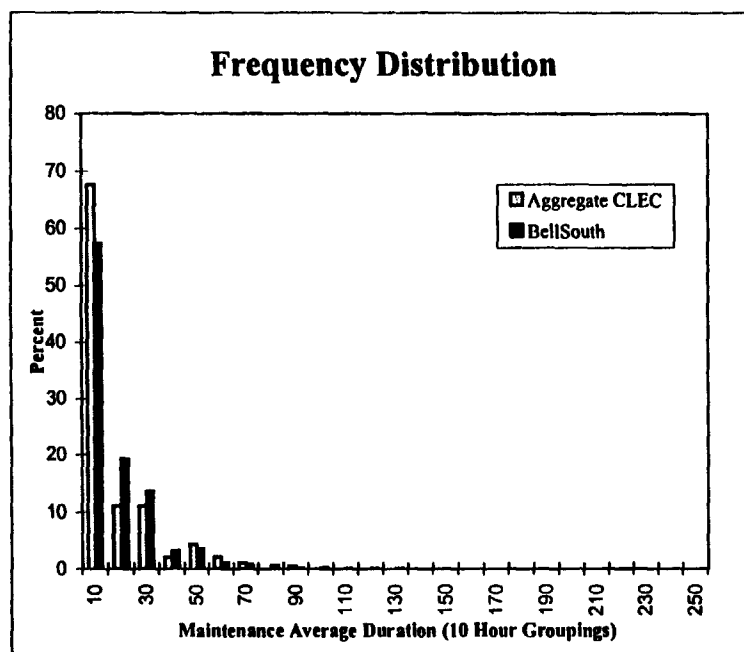
Service Provider	Mean	Standard Deviation
BST	32.05	28.15
CLEC	33.95	28.35
Difference	-1.89	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-2.16	1.5392
FCC	-2.16	1.5406
BST	-2.06	2.4400

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted August BellSouth and CLEC Average Duration-Maintenance Non-Designed, Non-Dispatched



Descriptive Measures

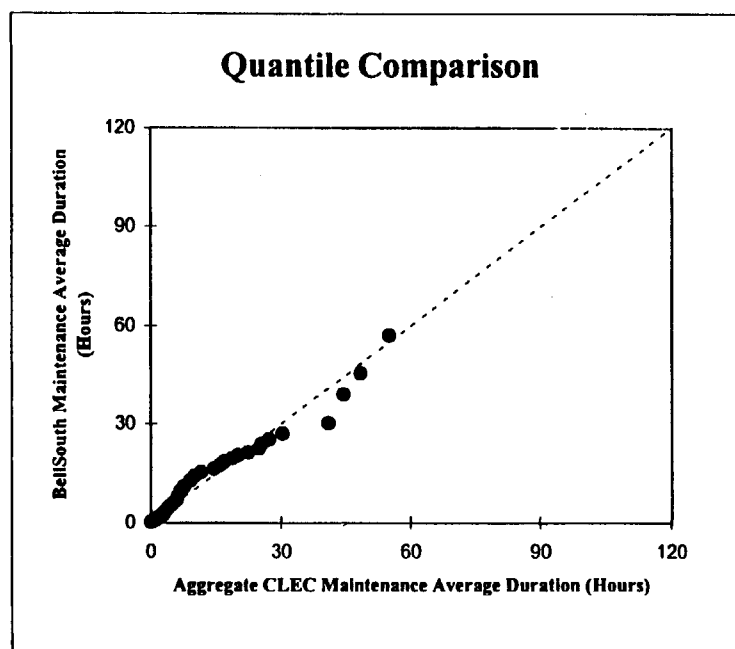
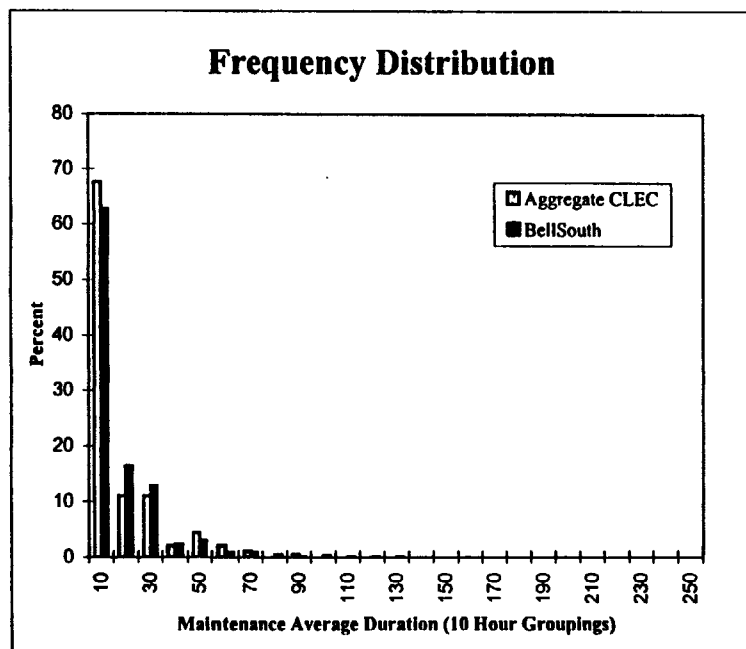
Service Provider	Mean	Standard Deviation
BST	12.43	15.86
CLEC	11.10	15.40
Difference	1.33	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	1.63	5.1465
FCC	1.63	5.1401
BST	1.41	8.4733

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted August BellSouth and CLEC Average Duration-Maintenance Non-Designed, Non-Dispatched



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	11.11	15.49
CLEC	11.10	15.40
Difference	0.01	

Analytic Measures

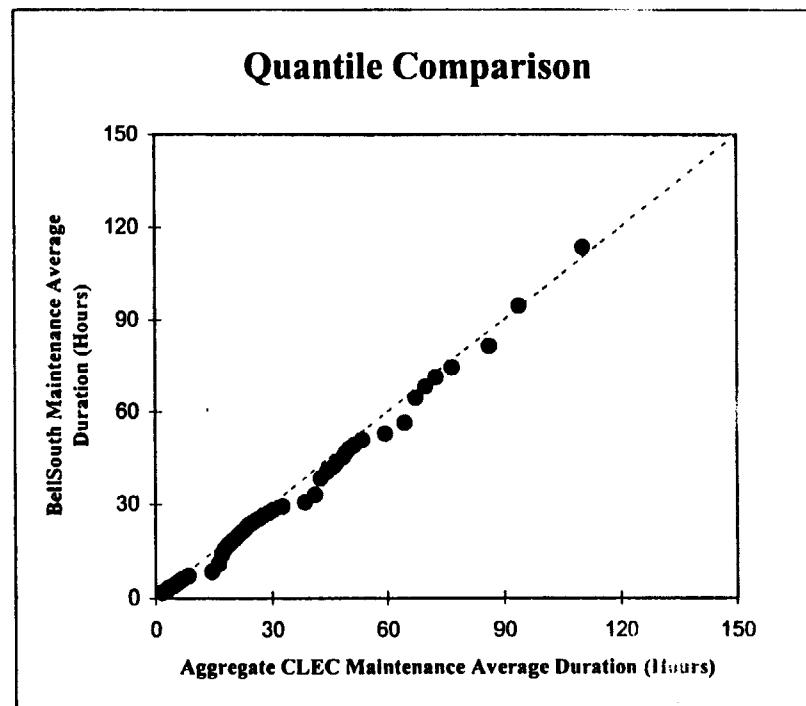
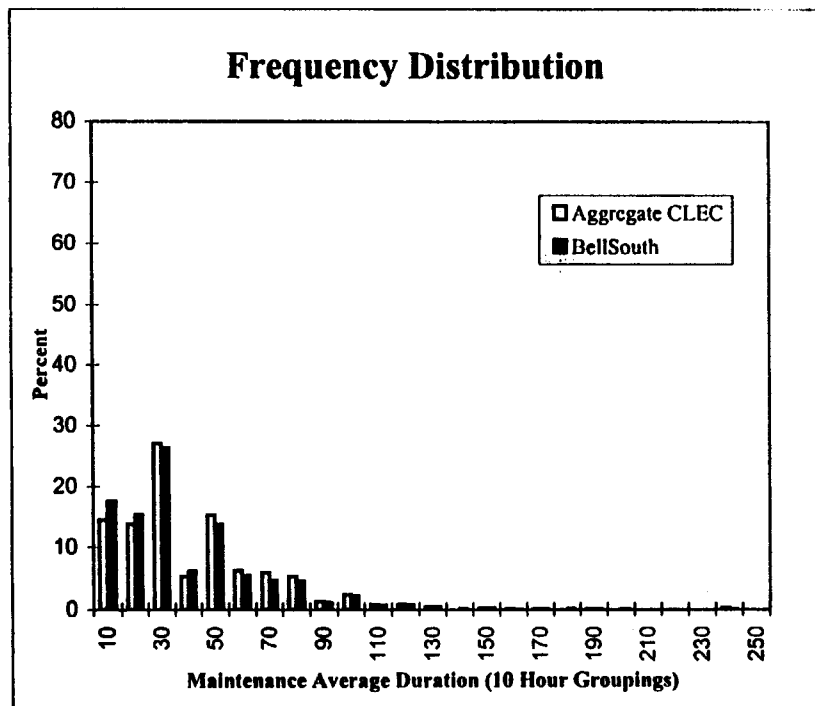
Testing Method	Test Statistic	P-value (percent)
LCUG	0.01	49.6660
FCC	0.01	49.6660
BST	-0.01	49.6851

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted

August BellSouth and CLEC Average Duration-Maintenance

Non-Designed, Dispatched, Residential



Descriptive Measures

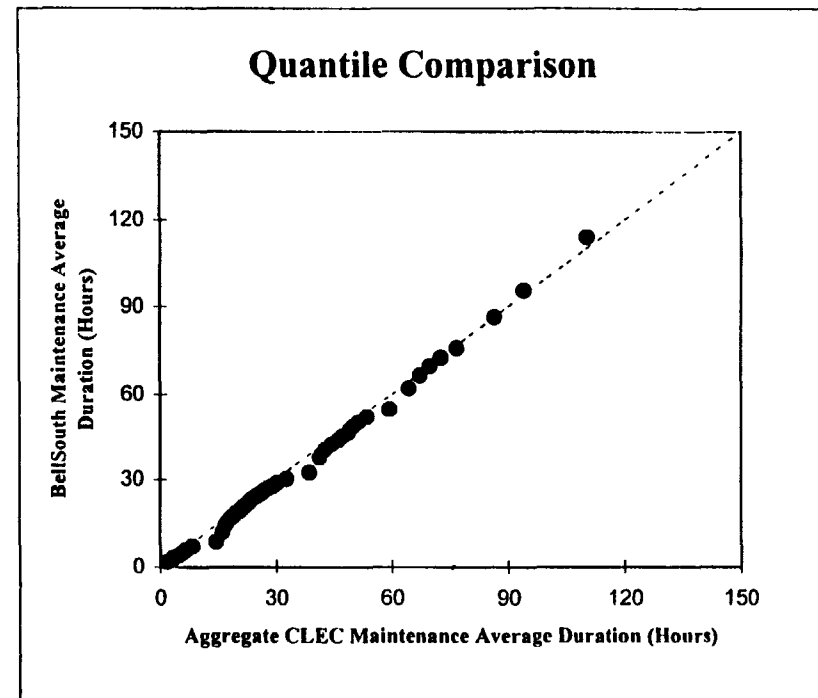
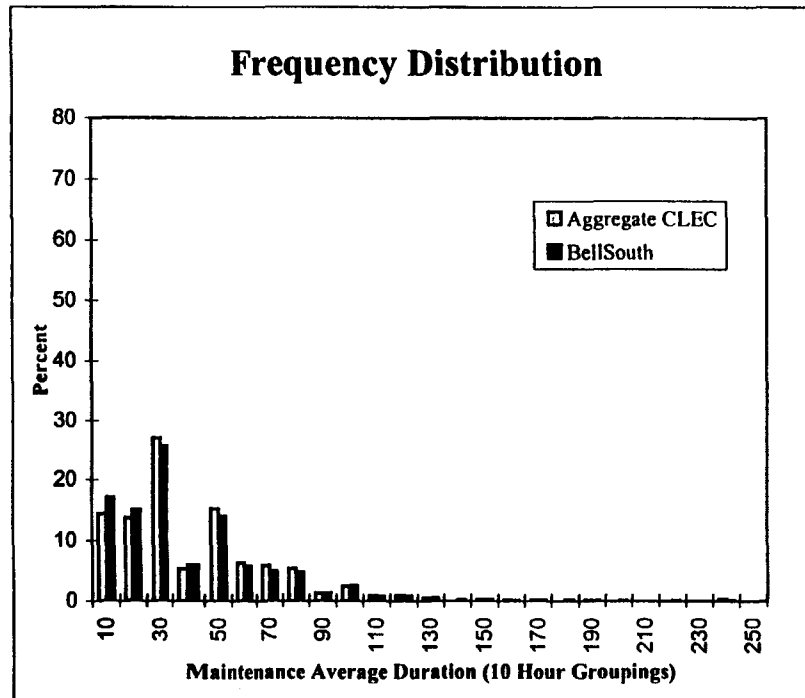
Service Provider	Mean	Standard Deviation
BST	34.08	27.85
CLEC	36.77	28.75
Difference	-2.69	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-2.81	0.2511
FCC	-2.80	0.2529
BST	-2.29	1.4590

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted August BellSouth and CLEC Average Duration-Maintenance Non-Designed, Dispatched, Residential



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	35.05	28.44
CLEC	36.77	28.75
Difference	-1.73	

Analytic Measures

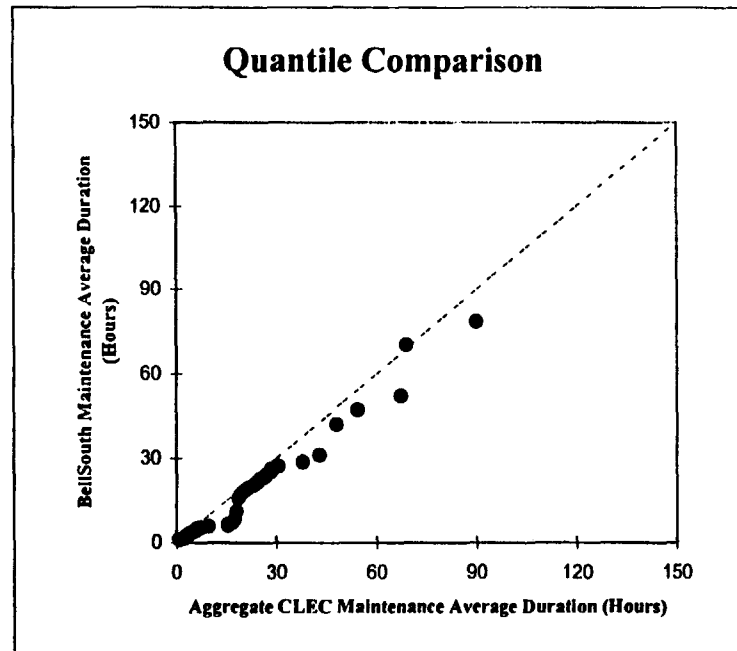
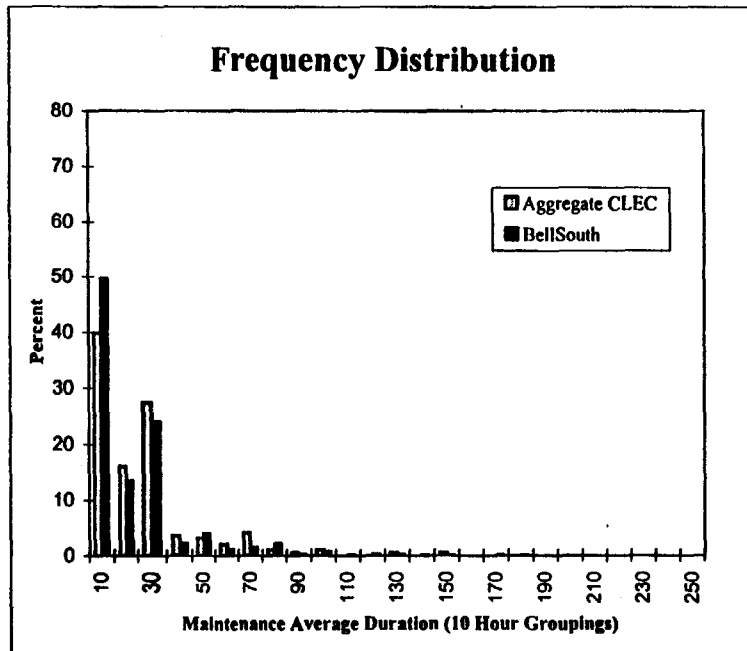
Testing Method	Test Statistic	P-value (percent)
LCUG	-1.76	3.9116
FCC	-1.76	3.9157
BST	-1.80	4.1290

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted

August BellSouth and CLEC Average Duration-Maintenance

Non-Designed, Dispatched, Business



Descriptive Measures

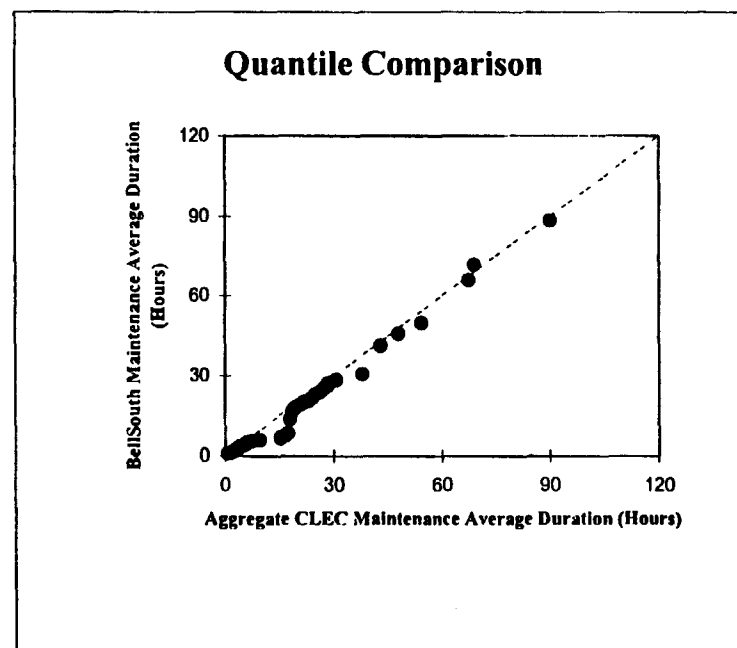
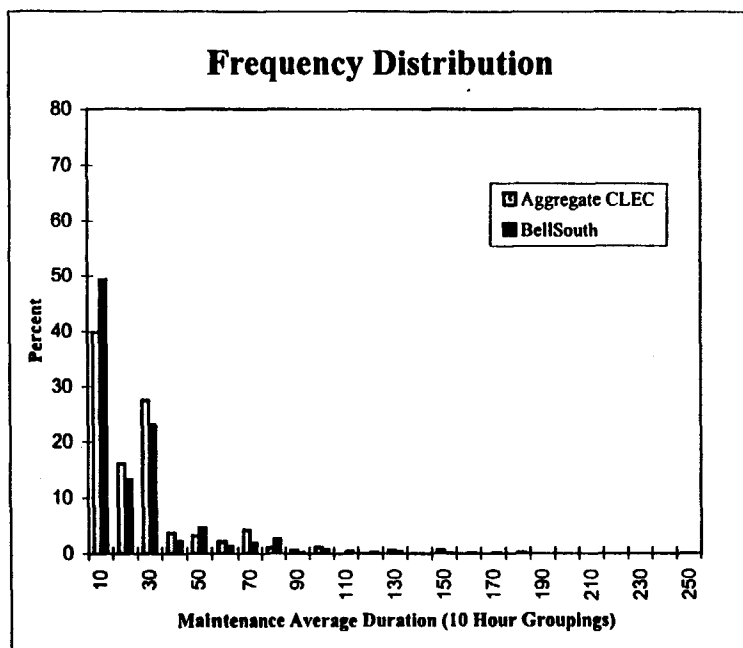
Service Provider	Mean	Standard Deviation
BST	17.77	21.29
CLEC	21.29	22.49
Difference	-3.51	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-2.27	1.1700
FCC	-2.26	1.1795
BST	-1.31	10.0863

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted August BellSouth and CLEC Average Duration-Maintenance Non-Designed, Dispatched, Business



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	18.64	22.41
CLEC	21.29	22.49
Difference	-2.65	

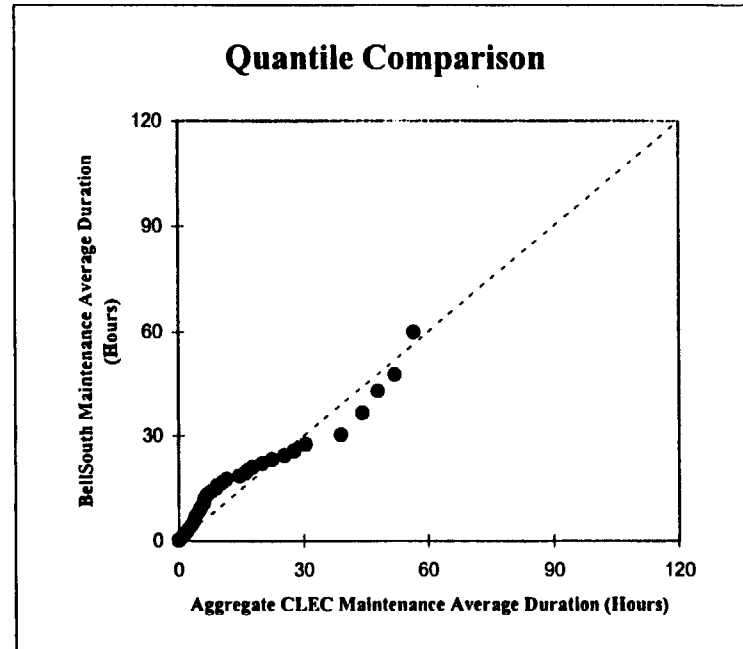
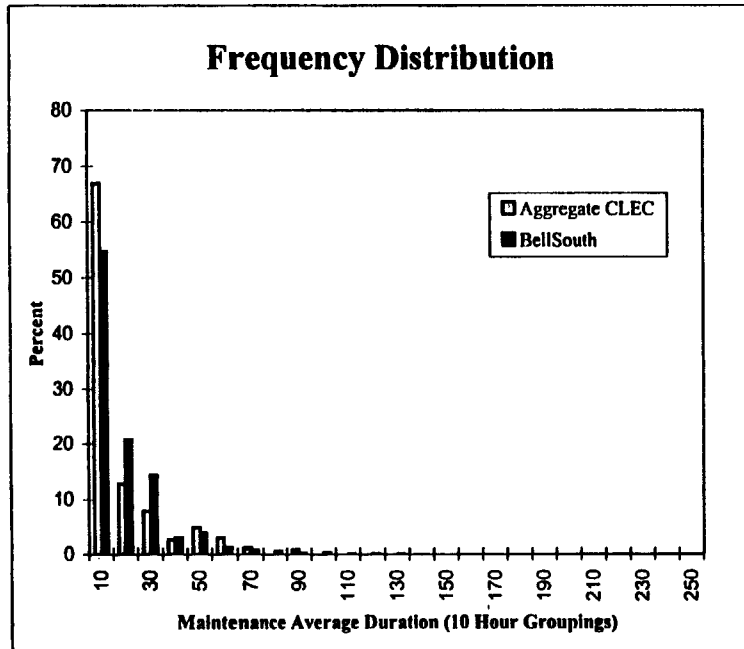
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-1.62	5.2464
FCC	-1.62	5.2479
BST	-0.89	19.0851

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted

August BellSouth and CLEC Average Duration-Maintenance Non-Designed, Non-Dispatched, Residential



Descriptive Measures

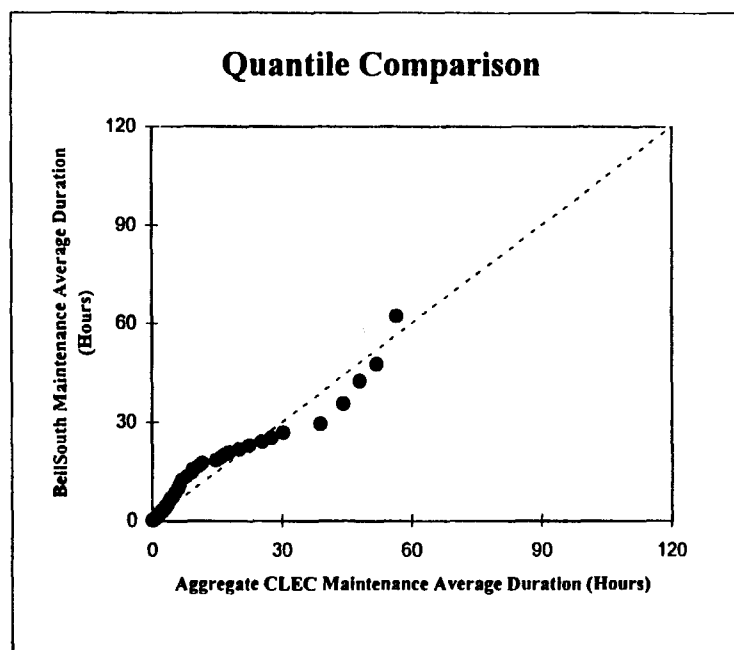
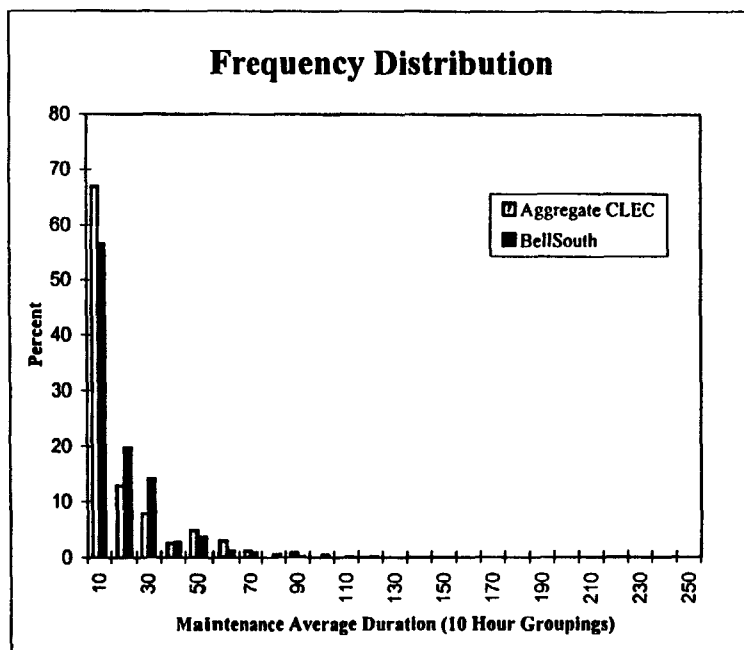
Service Provider	Mean	Standard Deviation
BST	13.06	15.99
CLEC	11.80	16.46
Difference	1.26	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	1.28	10.0934
FCC	1.28	10.1005
BST	1.04	15.2765

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted August BellSouth and CLEC Average Duration-Maintenance Non-Designed, Non-Dispatched, Residential



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	12.74	16.05
CLEC	11.80	16.46
Difference	0.94	

Analytic Measures

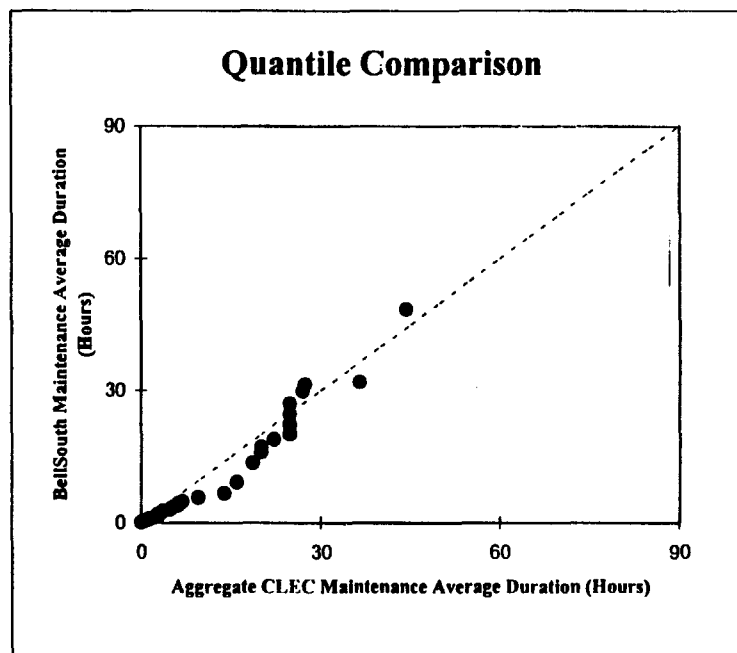
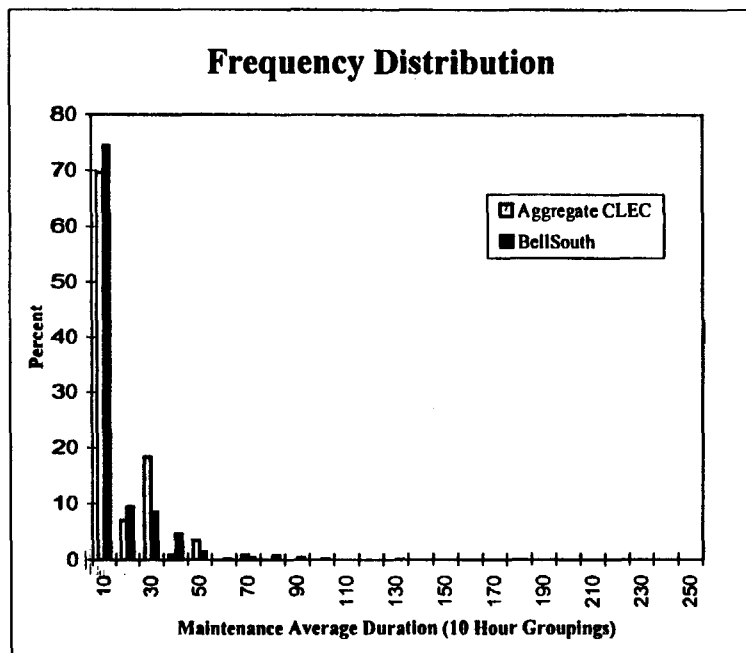
Testing Method	Test Statistic	P-value (percent)
LCUG	0.95	17.1340
FCC	0.95	17.1407
BST	0.79	21.8735

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted

August BellSouth and CLEC Average Duration-Maintenance

Non-Designed, Non-Dispatched, Business



Descriptive Measures

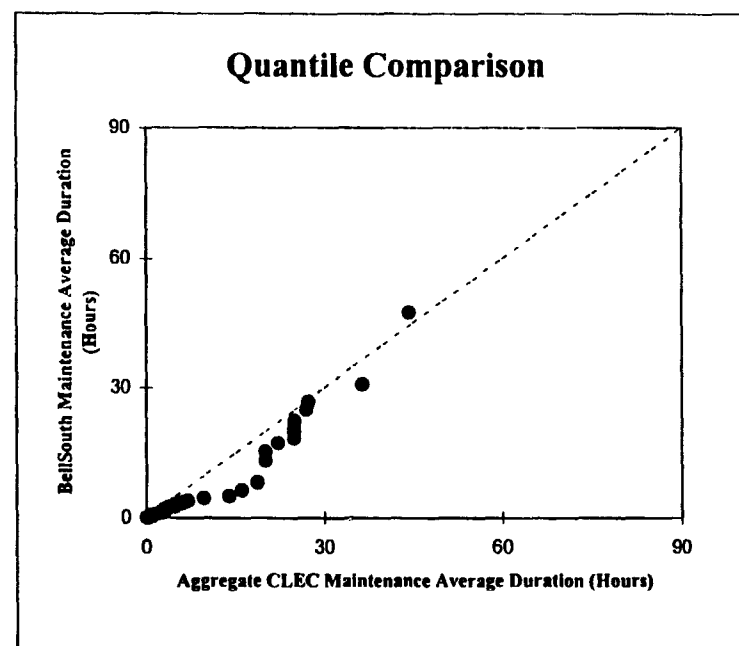
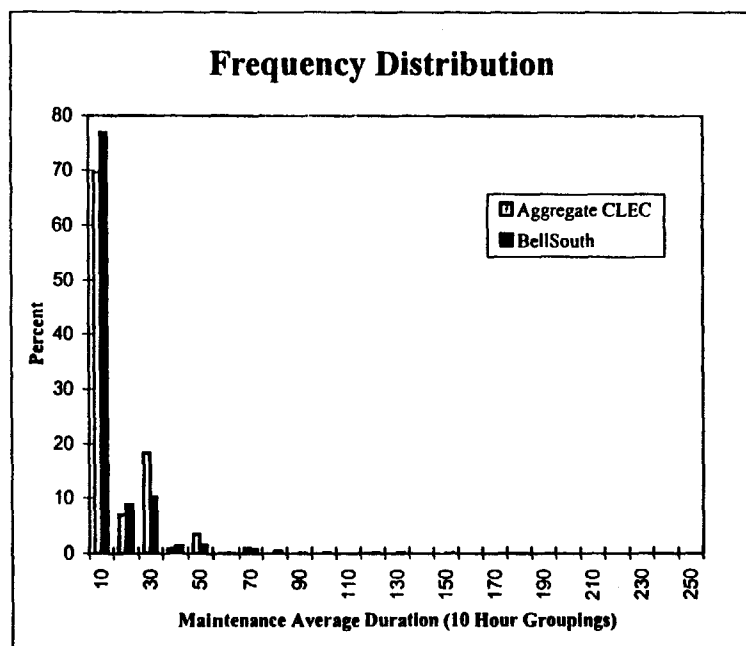
Service Provider	Mean	Standard Deviation
BST	8.44	14.42
CLEC	9.47	12.52
Difference	-1.04	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-0.76	22.3585
FCC	-0.76	22.2793
BST	-0.97	17.0505

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted August BellSouth and CLEC Average Duration-Maintenance Non-Designed, Non-Dispatched, Business



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	7.34	13.46
CLEC	9.47	12.52
Difference	-2.13	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-1.68	4.6902
FCC	-1.68	4.6589
BST	-1.55	6.7569

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

RESALE SERVICES - RESELLER: AGG - CLEC Aggregate

Report Period: 08/01/1998 to 08/31/1998

SQM: Maintenance Average Duration Non-detailed Report

	Residence			Business			Res + Bus		
	Dispatched	Non-Disp.	Total	Dispatched	Non-Disp.	Total	Dispatched	Non-Disp.	Total
ALABAMA	36.71	9.40	29.77	14.61	9.79	12.89	30.84	9.55	24.79
FLORIDA	26.53	12.08	20.97	18.84	12.55	16.04	24.00	12.26	19.24
GEORGIA	28.51	14.37	24.00	14.35	7.60	11.79	25.93	12.84	21.60
KENTUCKY	28.58	14.63	25.21	21.58	10.69	17.49	26.63	12.97	22.74
LOUISIANA	36.77	11.80	30.90	21.29	9.47	16.88	33.95	11.10	27.89
MISSISSIPPI	37.11	9.10	27.71	13.97	1.74	10.91	36.14	8.90	27.09
NORTH CAROLINA	45.76	14.19	33.85	28.77	11.89	21.28	40.83	13.38	29.90
SOUTH CAROLINA	34.98	9.97	25.18	26.28	9.23	20.35	33.03	9.82	24.16
TENNESSEE	52.69	19.43	43.82	18.22	14.85	16.62	47.93	18.13	38.86
REGION	33.14	12.81	26.45	19.12	10.97	15.76	29.94	12.26	23.76

*NA = Not Applicable (NA indicates measurements that do not apply to the particular measure)
Blank cells occur as a result of either no activity or when a divide by zero error would result.*

RETAIL SERVICES: BST - BST Aggregate

Report Period: 08/01/1998 to 08/31/1998

**SQM: Maintenance Average Duration
Non-detailed Report**

	Residence			Business			Res + Bus		
	Dispatched	Non-Disp.	Total	Dispatched	Non-Disp.	Total	Dispatched	Non-Disp.	Total
ALABAMA	33.79	14.20	26.45	12.06	7.87	10.77	29.98	13.34	23.92
FLORIDA	28.05	13.39	21.90	17.08	9.29	14.08	25.55	12.55	20.19
GEORGIA	27.57	15.29	22.70	14.10	8.67	12.26	24.68	14.12	20.62
KENTUCKY	38.07	18.36	31.26	19.36	6.94	15.77	35.20	16.96	29.04
LOUISIANA	34.08	13.06	25.21	17.77	8.44	14.69	31.01	12.43	23.45
MISSISSIPPI	33.55	12.11	25.18	10.30	4.79	8.54	29.53	11.14	22.55
NORTH CAROLINA	43.87	15.03	31.48	25.59	10.46	20.40	40.03	14.32	29.40
SOUTH CAROLINA	35.50	12.88	27.06	24.84	11.68	20.72	33.34	12.68	25.87
TENNESSEE	60.00	23.64	44.88	20.64	9.00	16.93	53.54	21.97	40.85
REGION	35.97	15.36	27.63	17.70	8.97	14.69	32.32	14.33	25.24

*NA = Not Applicable (NA indicates measurements that do not apply to the particular measure)
Blank cells occur as a result of either no activity or when a divide by zero error would result.*

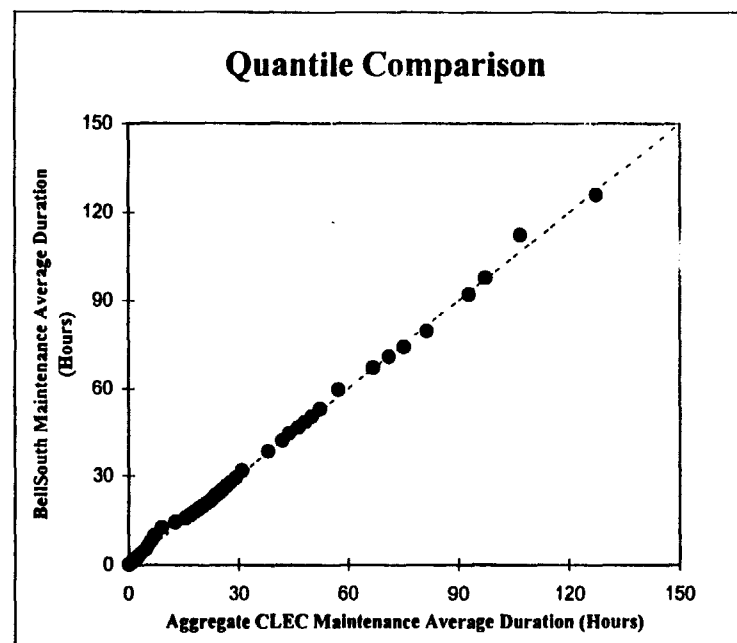
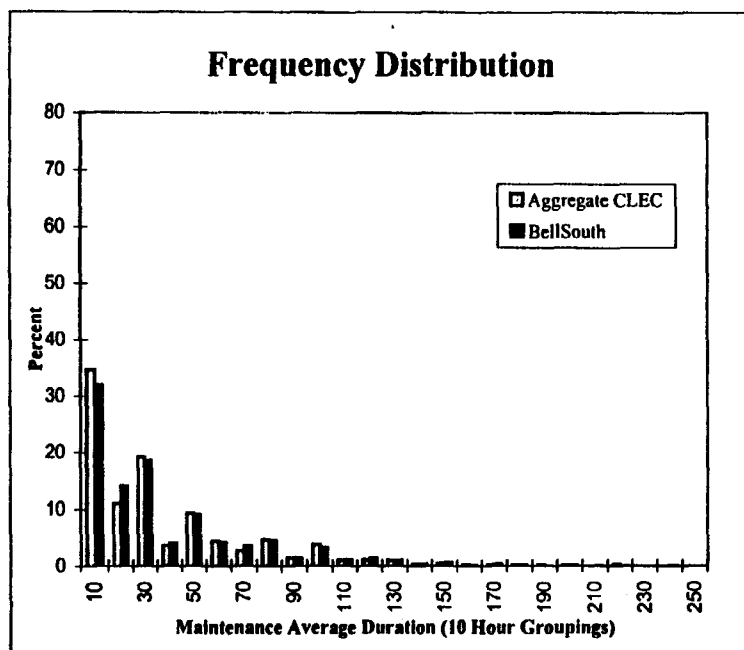
Appendix F
Maintenance Average Duration (MAD) - September Graphics

I. Graphical Representations

<u>Unadjusted</u>	<u>Adjusted</u>
1. All CasesF-1	1. All CasesF-2
2. DispatchedF-3	2. DispatchedF-4
3. Non-DispatchedF-5	3. Non-DispatchedF-6
4. Dispatched, ResidentialF-7	4. Dispatched, ResidentialF-8
5. Dispatched, BusinessF-9	5. Dispatched, BusinessF-10
6. Non-Dispatched, ResidentialF-11	6. Non-Dispatched, ResidentialF-12
7. Non-Dispatched, BusinessF-13	7. Non-Dispatched, BusinessF-14

II. SQM.....F-15

Unadjusted September BellSouth and CLEC Average Duration-Maintenance Non-Designed, All Cases



Descriptive Measures

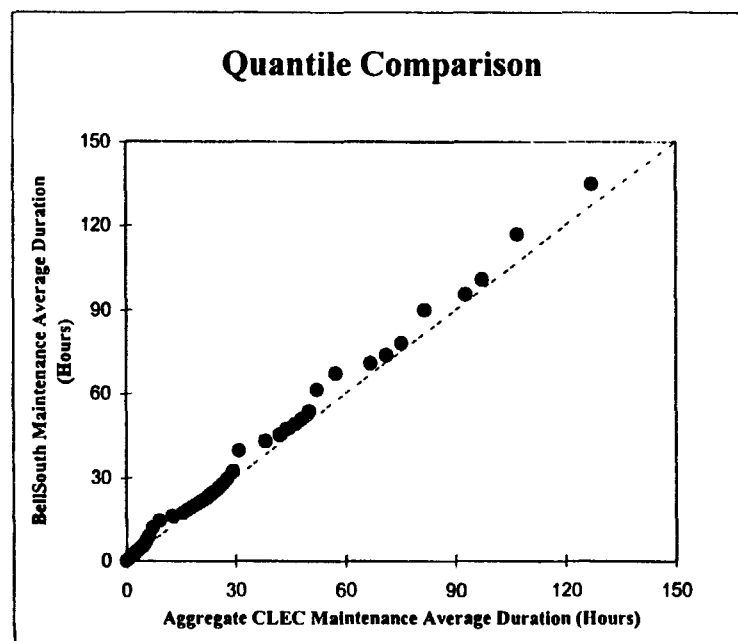
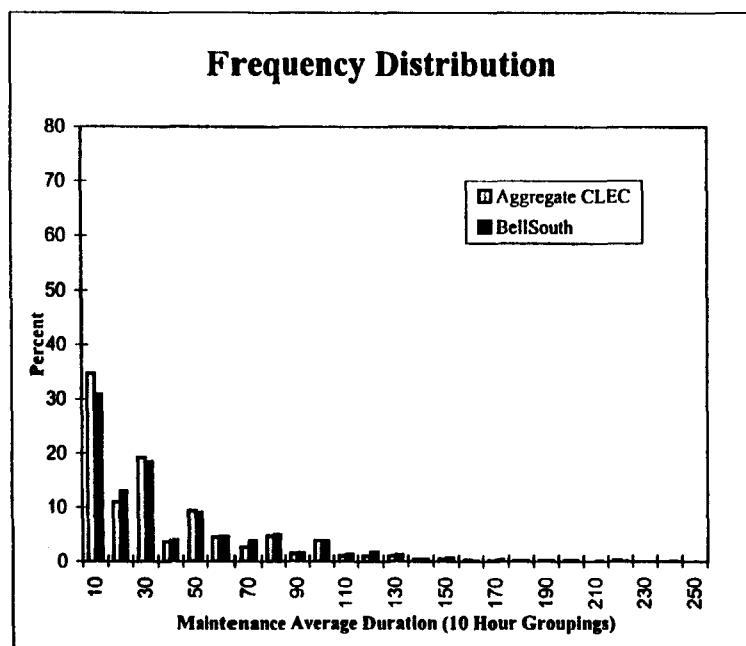
Service Provider	Mean	Standard Deviation
BST	32.42	34.46
CLEC	32.23	35.15
Difference	0.19	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	0.24	40.5990
FCC	0.24	40.6031
BST	0.15	44.1390

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted September BellSouth and CLEC Average Duration-Maintenance Non-Designed, All Cases



Descriptive Measures

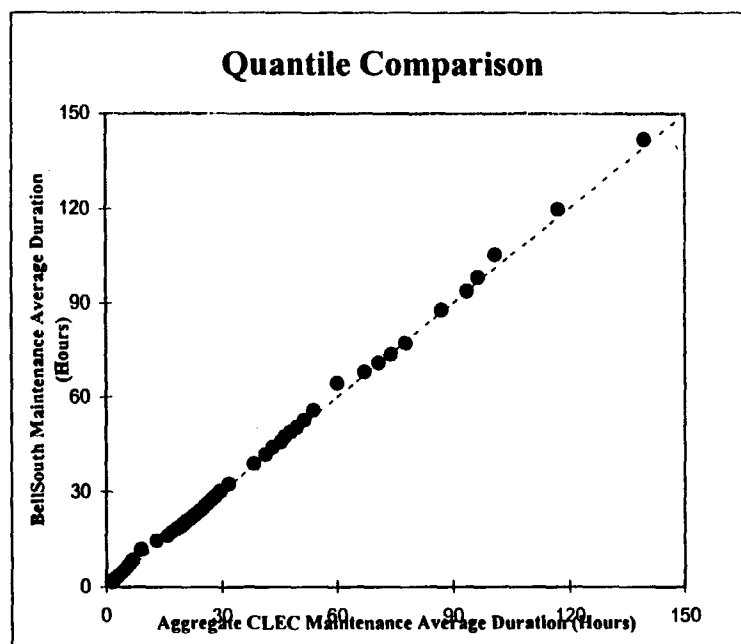
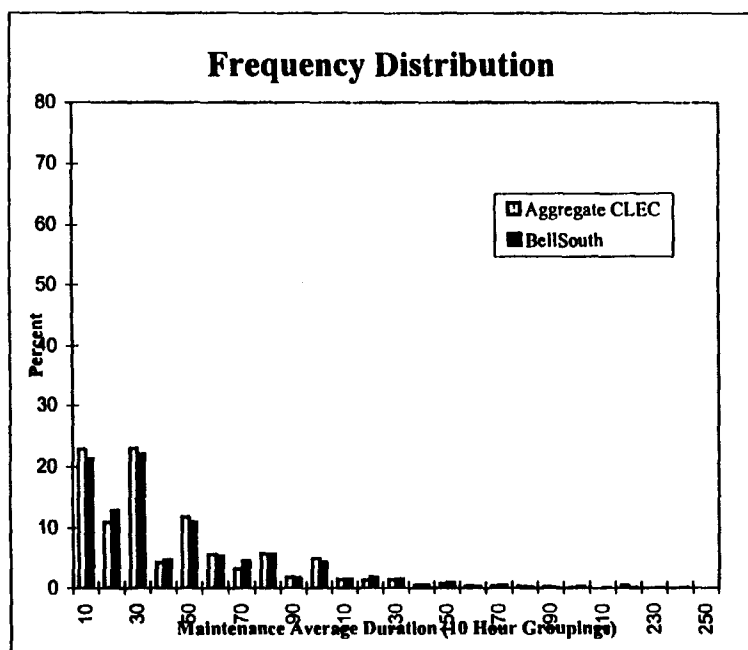
Service Provider	Mean	Standard Deviation
BST	34.55	36.23
CLEC	32.23	35.15
Difference	2.32	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	2.81	0.2448
FCC	2.82	0.2435
BST	2.43	1.0729

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted September BellSouth and CLEC Average Duration-Maintenance Non-Designed, Dispatched



Descriptive Measures

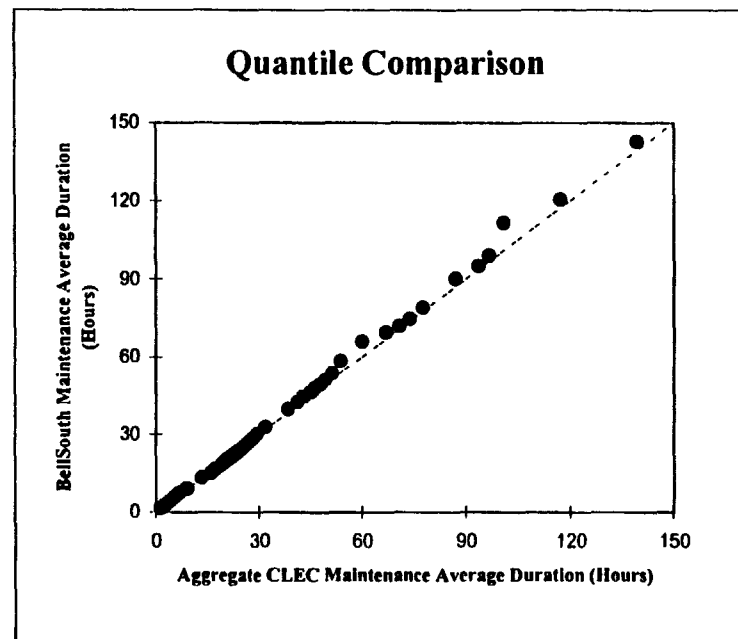
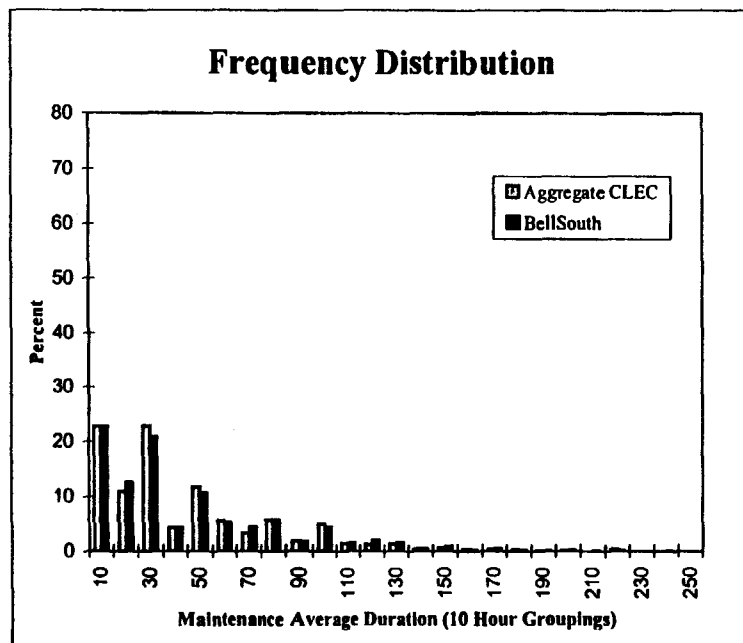
Service Provider	Mean	Standard Deviation
BST	39.67	36.37
CLEC	39.11	36.09
Difference	0.56	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	0.58	28.2469
FCC	0.58	28.2431
BST	0.38	35.4005

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted September BellSouth and CLEC Average Duration-Maintenance Non-Designed, Dispatched



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	39.94	37.28
CLEC	39.11	36.09
Difference	0.83	

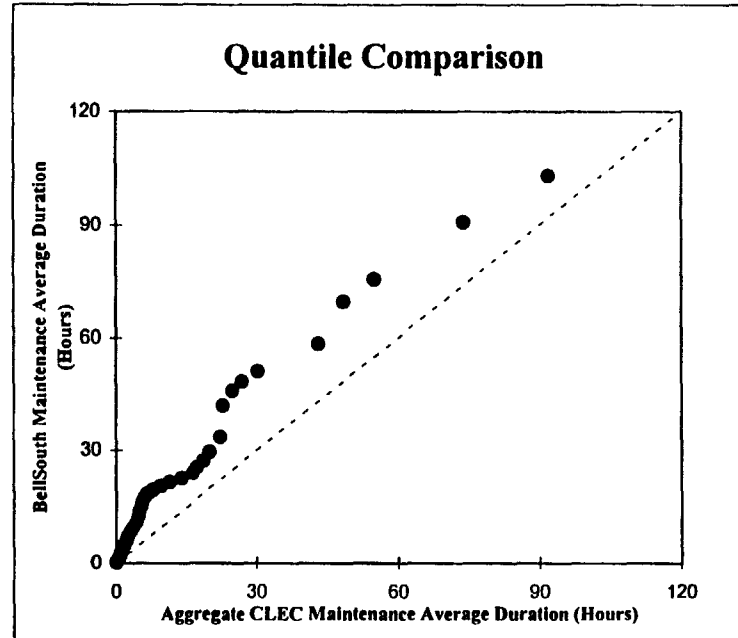
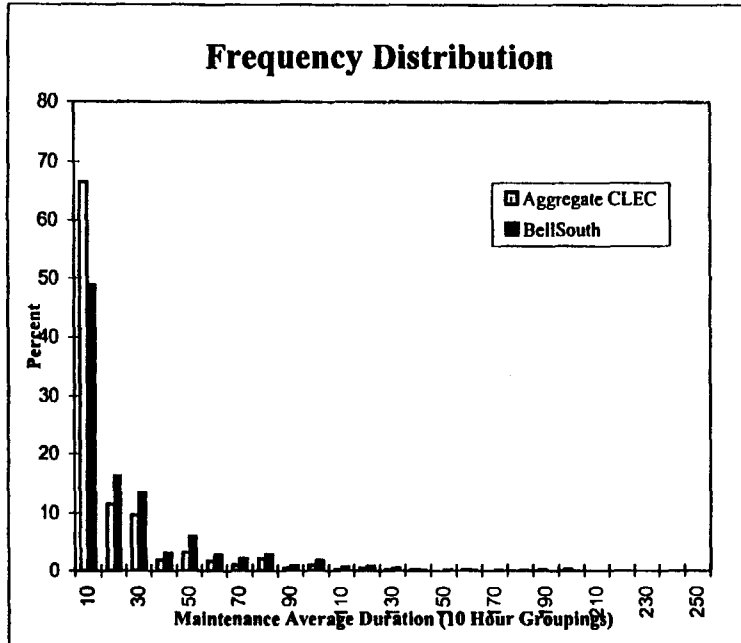
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	0.83	20.2465
FCC	0.83	20.2276
BST	0.68	25.0975

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted

September BellSouth and CLEC Average Duration-Maintenance Non-Designed, Non-Dispatched



Descriptive Measures

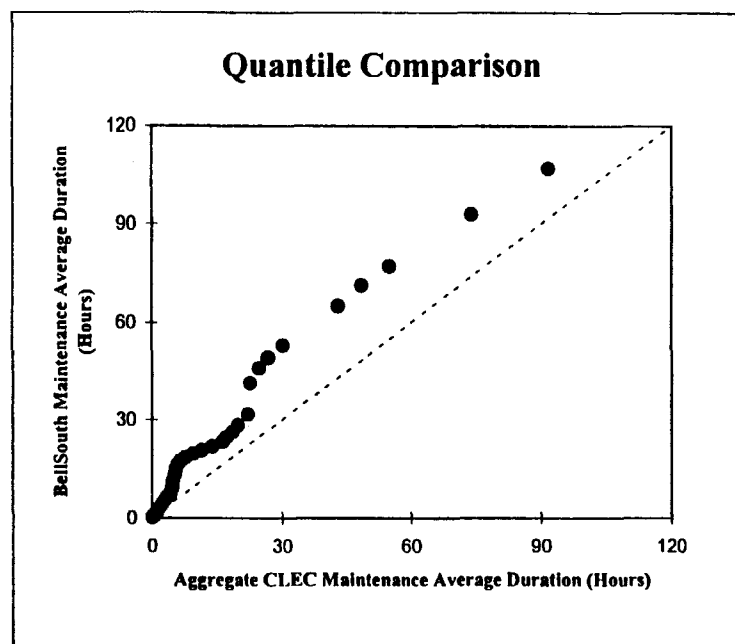
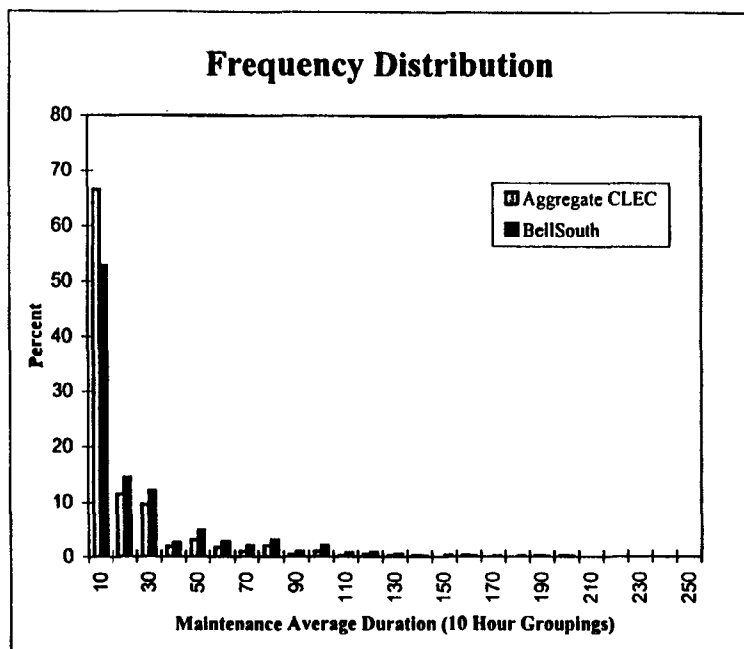
Service Provider	Mean	Standard Deviation
BST	20.94	27.55
CLEC	14.01	24.52
Difference	6.92	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	5.79	0.0000
FCC	5.80	0.0000
BST	4.78	0.0023

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted September BellSouth and CLEC Average Duration-Maintenance Non-Designed, Non-Dispatched



Descriptive Measures

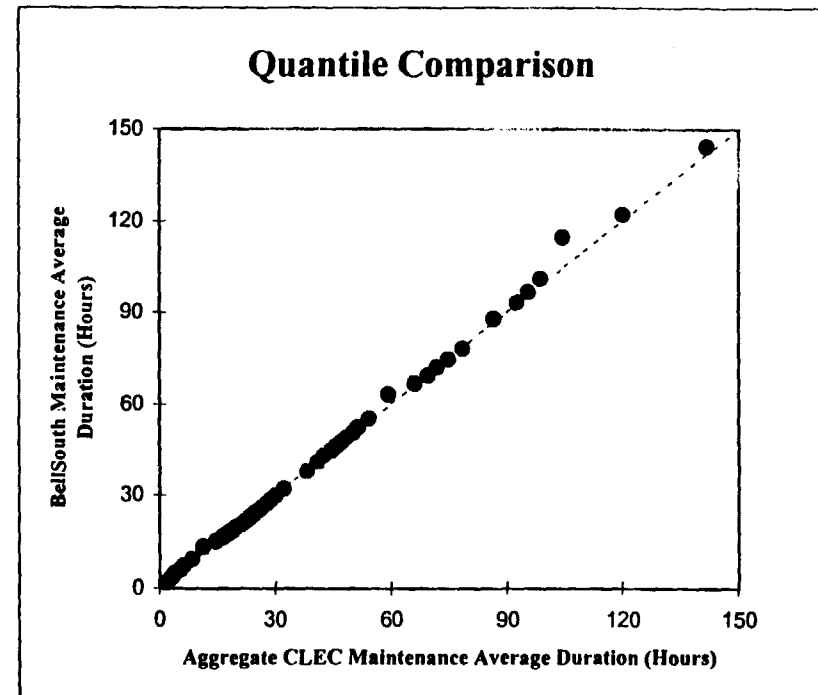
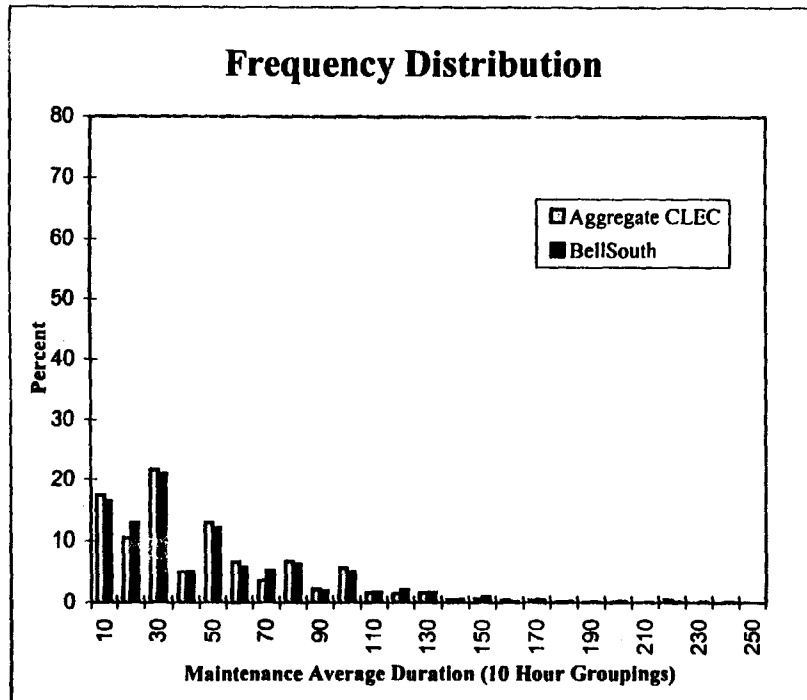
Service Provider	Mean	Standard Deviation
BST	20.31	28.79
CLEC	14.01	24.52
Difference	6.30	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	5.05	0.0000
FCC	5.06	0.0000
BST	5.55	0.0003

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted September BellSouth and CLEC Average Duration-Maintenance Non-Designed, Dispatched, Residential



Descriptive Measures

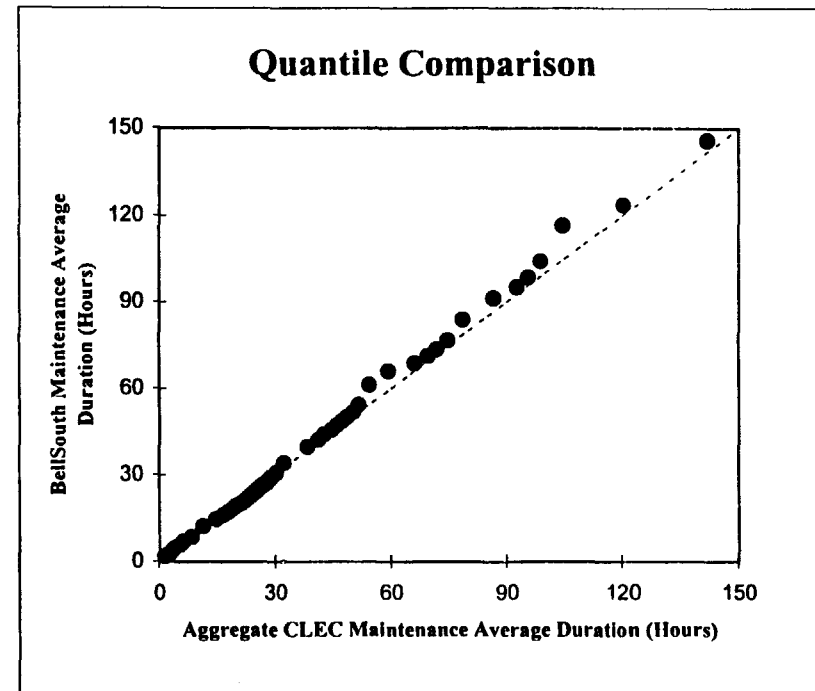
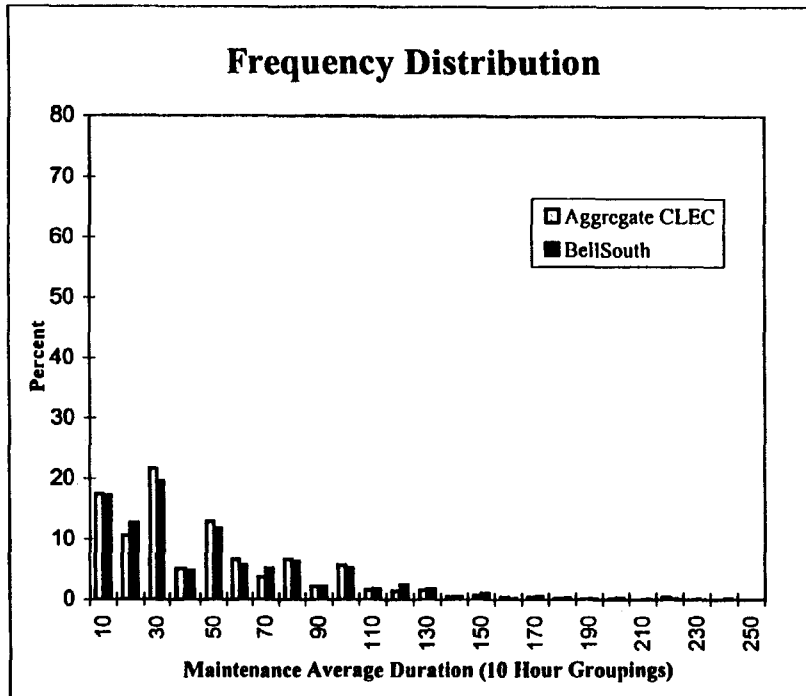
Service Provider	Mean	Standard Deviation
BST	43.69	37.27
CLEC	43.41	36.81
Difference	0.28	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	0.24	40.3751
FCC	0.24	40.3723
BST	0.14	44.3989

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted September BellSouth and CLEC Average Duration-Maintenance Non-Designed, Dispatched, Residential



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	44.73	38.50
CLEC	43.41	36.81
Difference	1.32	

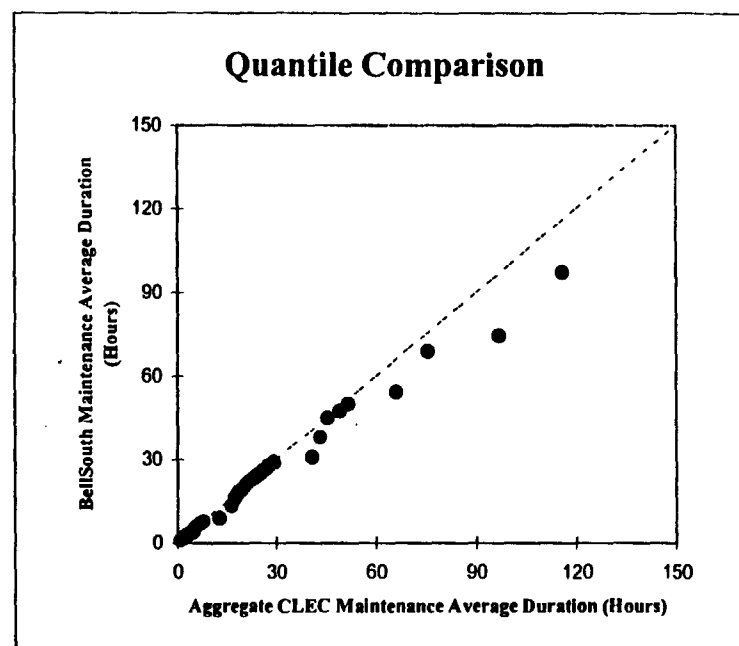
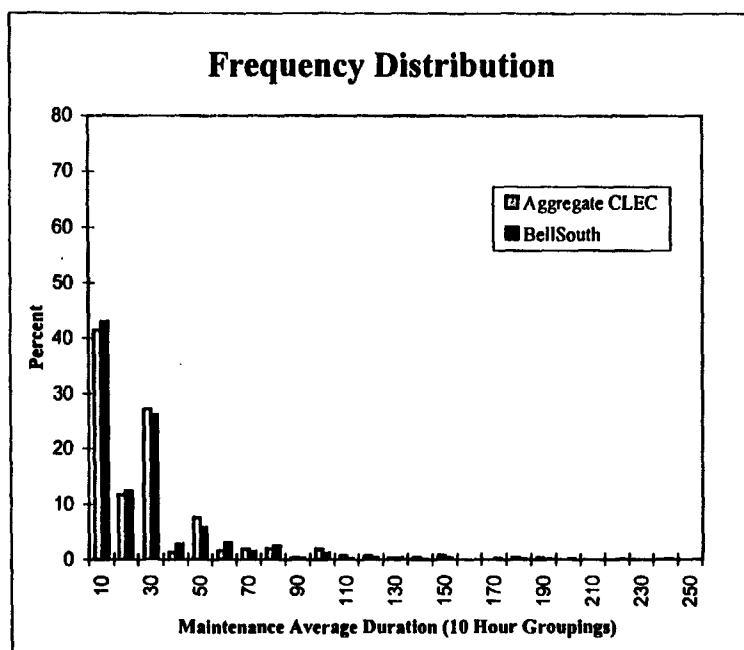
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	1.13	12.8696
FCC	1.13	12.8447
BST	0.99	16.5790

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted

September BellSouth and CLEC Average Duration-Maintenance Non-Designed, Dispatched, Business



Descriptive Measures

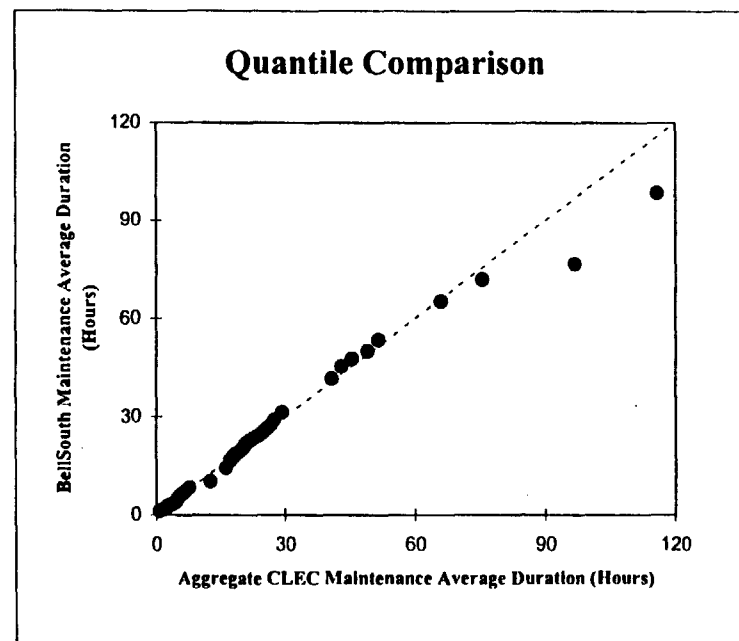
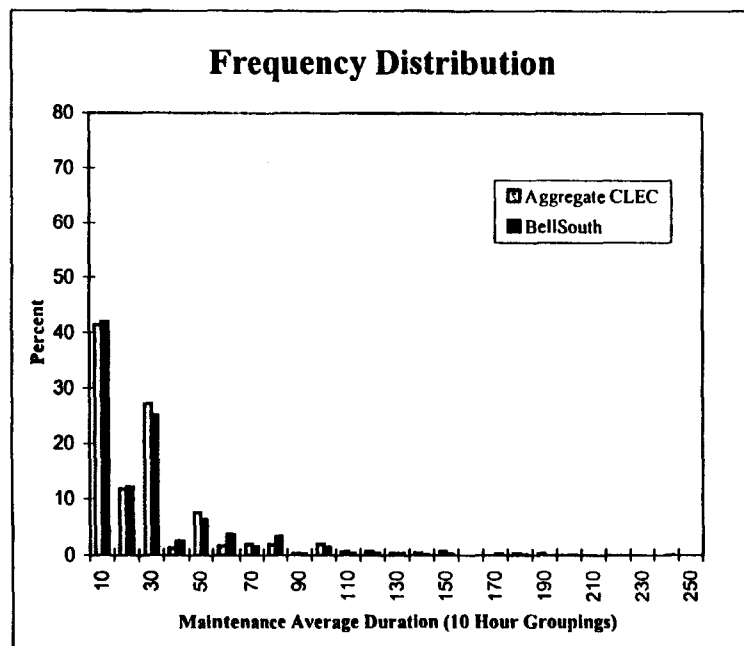
Service Provider	Mean	Standard Deviation
BST	21.78	25.18
CLEC	23.90	28.70
Difference	-2.12	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-1.47	7.0112
FCC	-1.47	7.1016
BST	-0.89	18.9309

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted September BellSouth and CLEC Average Duration-Maintenance Non-Designed, Dispatched, Business



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	22.98	26.44
CLEC	23.90	28.70
Difference	-0.92	

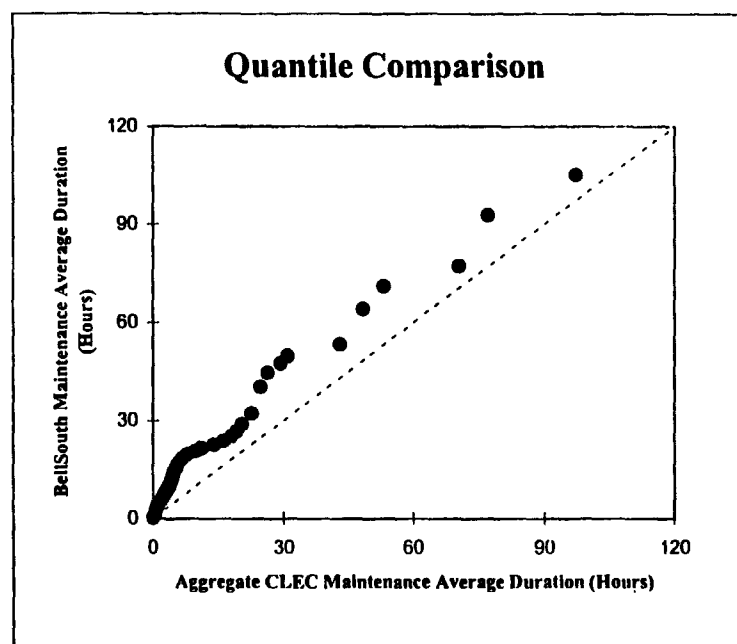
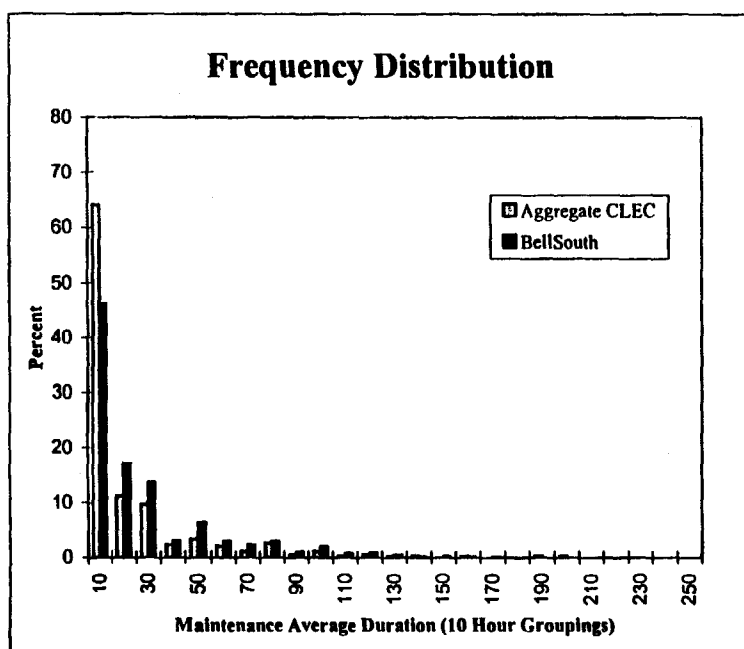
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-0.61	27.0616
FCC	-0.61	27.1166
BST	-0.41	34.1136

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted

September BellSouth and CLEC Average Duration-Maintenance Non-Designed, Non-Dispatched, Residential



Descriptive Measures

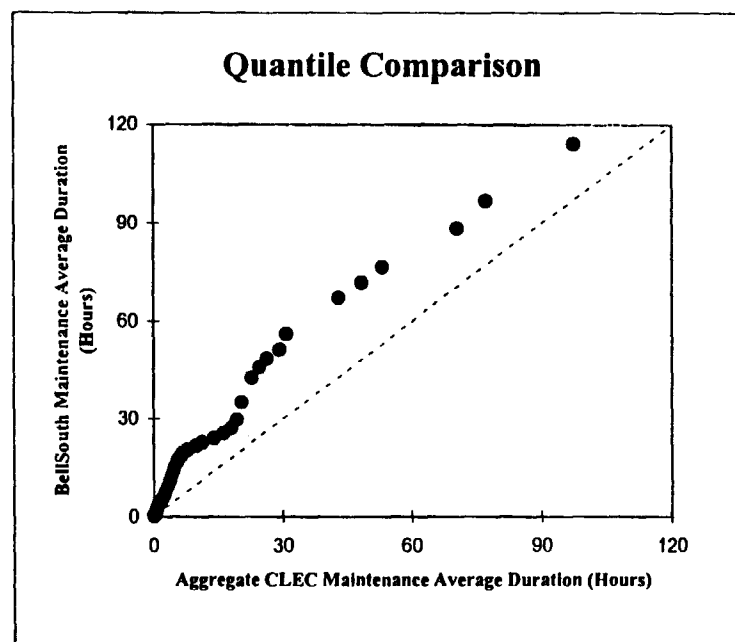
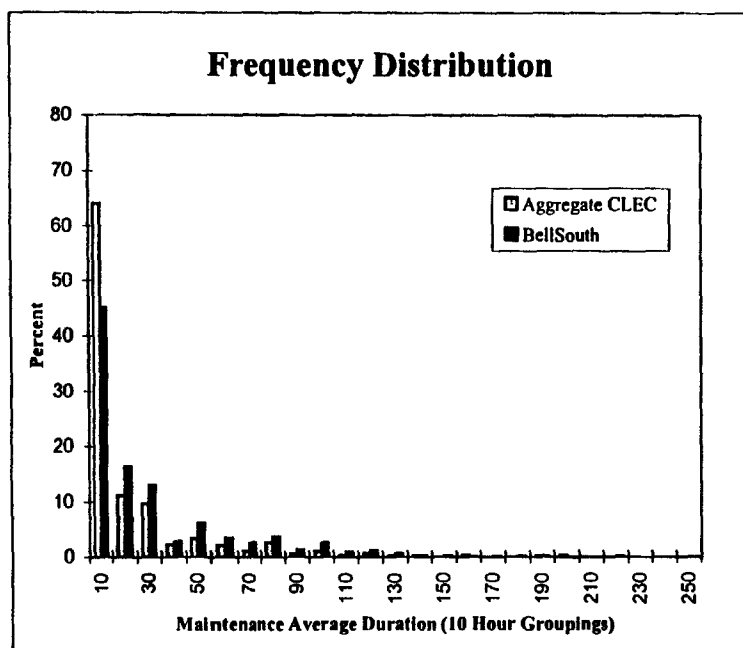
Service Provider	Mean	Standard Deviation
BST	22.15	28.12
CLEC	15.99	27.27
Difference	6.16	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	4.26	0.0010
FCC	4.27	0.0010
BST	3.36	0.1111

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted September BellSouth and CLEC Average Duration-Maintenance Non-Designed, Non-Dispatched, Residential



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	24.24	30.70
CLEC	15.99	27.27
Difference	8.25	

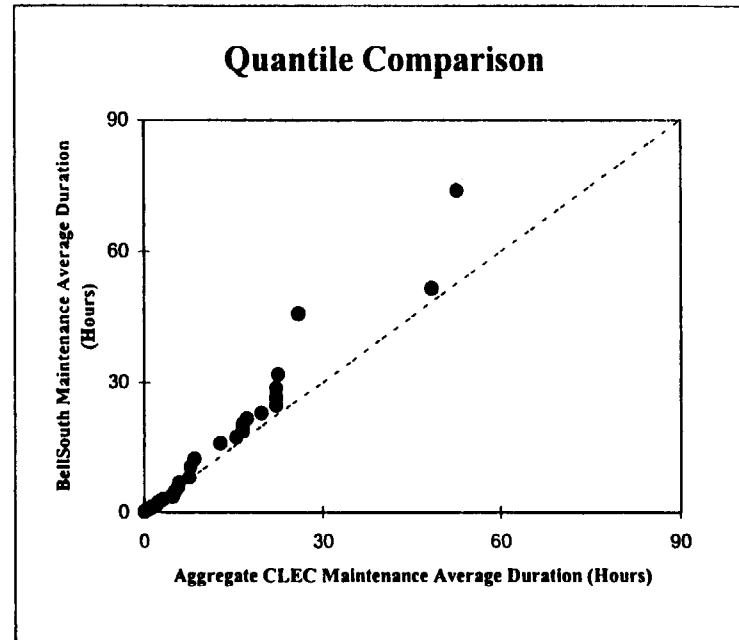
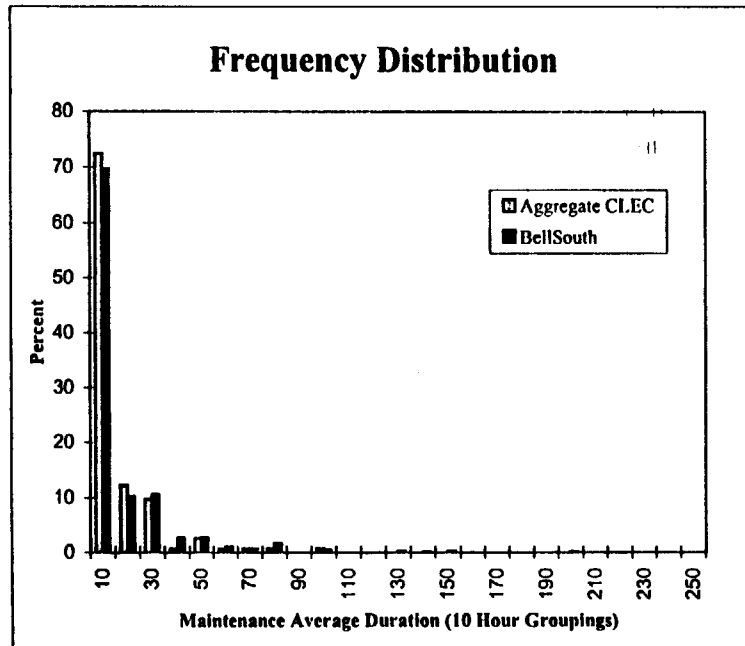
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	5.23	0.0000
FCC	5.24	0.0000
BST	5.30	0.0005

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted

September BellSouth and CLEC Average Duration-Maintenance Non-Designed, Non-Dispatched, Business



Descriptive Measures

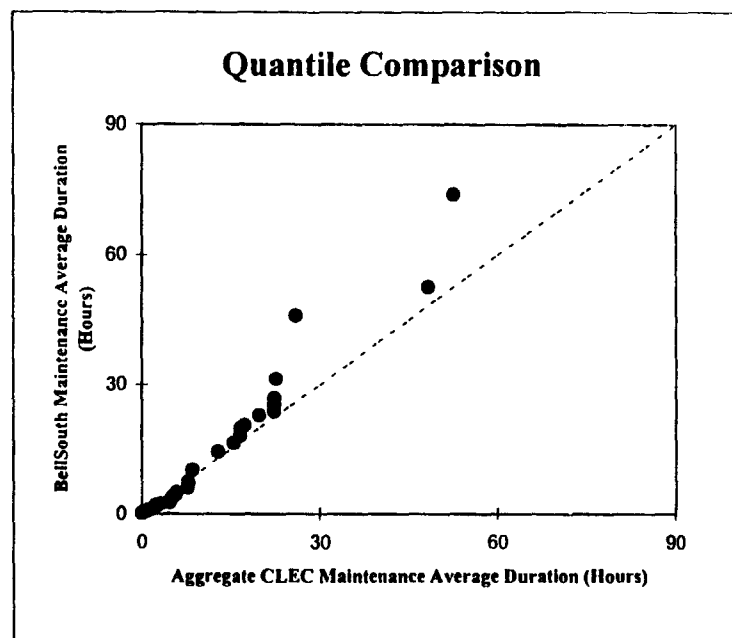
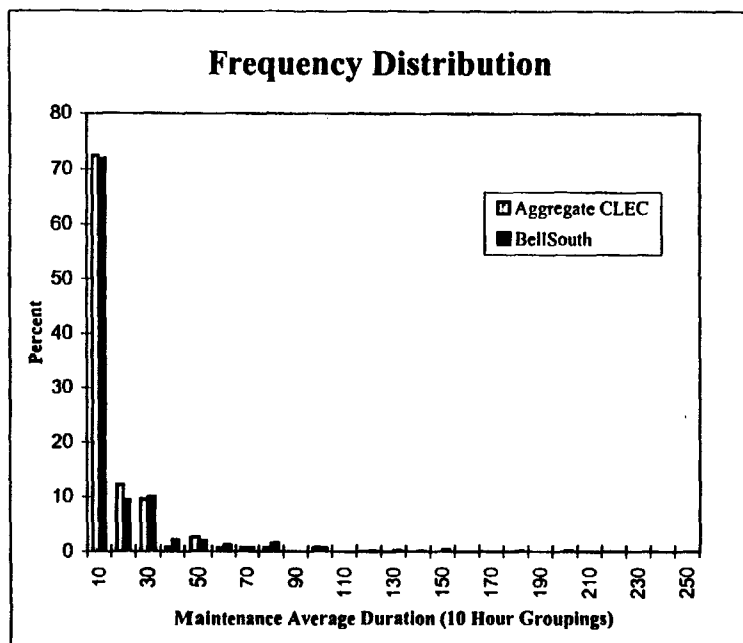
Service Provider	Mean	Standard Deviation
BST	11.03	19.81
CLEC	9.13	14.84
Difference	1.90	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	1.18	11.9778
FCC	1.19	11.7718
BST	0.89	19.1858

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted September BellSouth and CLEC Average Duration-Maintenance Non-Designed, Non-Dispatched, Business



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	10.64	20.56
CLEC	9.13	14.84
Difference	1.51	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	0.90	18.4693
FCC	0.91	18.2394
BST	0.51	30.8961

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

RESALE SERVICES - RESELLER: AGG - CLEC Aggregate

Report Period: 09/01/1998 to 09/30/1998

**SQM: Maintenance Average Duration
Non-detailed Report**

	Residence			Business			Res + Bus		
	Dispatched	Non-Disp.	Total	Dispatched	Non-Disp.	Total	Dispatched	Non-Disp.	Total
ALABAMA	37.10	11.67	30.21	16.68	5.35	12.94	30.80	9.32	24.56
FLORIDA	25.10	10.83	19.14	18.71	8.51	14.41	23.30	10.17	17.80
GEORGIA	26.25	10.66	21.06	15.56	14.28	15.03	24.35	11.50	19.87
KENTUCKY	25.08	9.36	20.74	16.42	5.31	10.96	22.19	7.10	16.67
LOUISIANA	43.41	15.99	36.39	23.90	9.13	19.02	39.11	14.01	32.23
MISSISSIPPI	43.85	16.65	33.60	9.83	3.97	6.60	42.46	15.64	32.09
NORTH CAROLINA	42.36	12.07	30.32	26.91	9.45	19.11	37.25	11.08	26.39
SOUTH CAROLINA	31.11	11.49	23.42	28.89	12.93	23.40	30.67	11.73	23.41
TENNESSEE	30.89	9.53	25.42	19.24	5.22	15.06	29.17	8.77	23.81
REGION	31.44	11.80	24.51	19.76	9.67	15.66	28.83	11.24	22.40

*NA = Not Applicable (NA indicates measurements that do not apply to the particular measure)
Blank cells occur as a result of either no activity or when a divide by zero error would result.*

RETAIL SERVICES: BST - BST Aggregate

Report Period: 09/01/1998 to 09/30/1998

**SQM: Maintenance Average Duration
Non-detailed Report**

	Residence			Business			Res + Bus		
	Dispatched	Non-Disp.	Total	Dispatched	Non-Disp.	Total	Dispatched	Non-Disp.	Total
ALABAMA	31.94	16.76	25.29	12.17	9.44	11.29	28.05	15.81	22.92
FLORIDA	26.09	12.56	20.20	16.88	8.19	13.60	23.99	11.73	18.81
GEORGIA	24.98	12.89	20.09	14.36	10.05	12.91	22.64	12.40	18.63
KENTUCKY	27.16	11.18	21.51	17.55	5.56	13.93	25.57	10.41	20.33
LOUISIANA	43.69	22.15	34.91	21.78	11.03	18.84	39.67	20.94	32.42
MISSISSIPPI	36.41	16.31	27.09	10.72	6.99	9.57	31.72	15.35	24.50
NORTH CAROLINA	41.84	12.59	30.62	25.33	9.07	19.86	38.02	11.90	28.27
SOUTH CAROLINA	32.22	11.12	24.38	27.30	11.41	21.96	31.16	11.18	23.88
TENNESSEE	30.21	11.90	22.78	15.03	5.89	12.07	27.41	11.07	21.00
REGION	31.61	14.26	24.43	17.78	8.80	14.75	28.73	13.39	22.60

*NA = Not Applicable (NA indicates measurements that do not apply to the particular measure)
Blank cells occur as a result of either no activity or when a divide by zero error would result.*

Appendix G
OSS Average Response Interval Calculations and Graphics

- I. Descriptive Measures.....G-1
- II. Time Series AnalysisG-2

Operating Support Services (OSS) Average Response Interval

Descriptive Measures

For a three month period from July to September 1998, daily OSS Response Interval data existed on thirteen systems, four of which were available to both BellSouth and the CLECs. In an attempt to compare the average response interval for BellSouth to the CLECs, we limited our analysis to the four systems for which there were "like-to-like" data. Without the knowledge of the length of each individual call, we were unable to calculate a variance for the average response interval. However, for each day for which there were data, we determined a daily average

response interval by taking the total amount of call time and dividing it by the number of calls. The CLEC daily average response intervals were subtracted from the corresponding BellSouth intervals, yielding a series of daily average response interval differences. An overall series was also calculated by averaging together the four sets of daily average response interval difference data. The results of these calculations are presented in Table 1.

Table 1 - Average Response Intervals and Differences (milliseconds)

Overall

Month	BST Avg.	CLEC Avg.	Difference
July	1004.103	994.9774	9.1256
August	1166.9031	847.2192	319.6839
September	1058.8630	956.0904	102.7726

ATLAS

Month	BST Avg.	CLEC Avg.	Difference
July	846.6394	703.1209	143.5185
August	781.1923	575.5153	205.6770
September	825.6310	641.7002	183.9308

RSAG(By ADDR)

Month	BST Avg.	CLEC Avg.	Difference
July	1523.8004	1219.4003	304.4001
August	1665.1581	1016.0048	649.1533
September	1705.3642	1179.6597	525.7045

DSAP

Month	BST Avg.	CLEC Avg.	Difference
July	554.2276	329.2773	224.9503
August	935.0707	469.7801	465.2906
September	588.7813	414.0856	174.6957

RSAG(By TN)

Month	BST Avg.	CLEC Avg.	Difference
July	1155.2793	1313.2923	-158.0130
August	1158.4645	999.9169	158.5476
September	1138.1552	1204.2639	-66.1087

It is of note that of the fifteen differences calculated, only two displayed negative differences, signaling even the possibility of any potential discrimination against the CLECs.

Time Series Analysis

Concerned with the possibility of a time dependence within the data, we employed time series analysis methodology. Figure 1 illustrates the average response interval differences for the four systems with "like-to-like" data. Figure 2 displays the average response interval differences for the overall series as a whole and also broken down by month.

A brief look at the graphs and the individual differences for each of the five series pointed out that the vast majority of days displayed positive differences. In fact, with only one exception, each day that exhibited a negative average response interval difference was always followed by a day with a positive difference. It was hard to judge from a preliminary study of the data and graphs if a time component was present, so we decided to engage in a more serious time series analysis.

The existence of unequal sample sizes for each day led us to reject the assumption that constant standard error between days existed and thus we had to conclude that the differences are not identically distributed. If we could estimate the daily variances, s_{1i}^2 and s_{2i}^2 , we would correct this problem by standardizing each difference by dividing by an estimate of the standard error as in (1).

$$\frac{d_i}{\sqrt{s_p^2 \left(\frac{1}{n_{1i}} + \frac{1}{n_{2i}} \right)}} \quad (1)$$

Here s_p^2 is the pooled variance estimate, n_{1i} is the total number of BellSouth calls for the i^{th} date and n_{2i} is the total number of CLEC calls for the i^{th} date. Lacking this, we did the next best thing. We assumed that the variance for each response every day was constant, but unknown. Dividing each difference, d_i , by

$$\sqrt{\frac{1}{n_{1i}} + \frac{1}{n_{2i}}}$$

provides a rescaling that is proportional to the typical standardized value.

After rescaling the data, we dealt with the issue of missing observations. For a few dates within our time frame of interest, the CLECs data were present while BellSouth data were not. To correct this problem, we imputed on those days the mean values from the series. Using this method, we have a tendency to underestimate the standard error. An alternative may be to employ the EM algorithm to impute these values. However, we did not use the EM algorithm, because we felt our method was more conservative.

The autocorrelation and partial autocorrelation functions for each series were plotted using Interactive Time Series Modeling 6.0 (ITSM) software in an attempt to identify the existence of a time dependent process. Table 2 illustrates the results of our time series analysis and the associated parameters.

Table 2 - Time Series Analysis Results

System	Result	Parameters	Estimated White Noise Variance
ATLAS	white noise	-	87193260
DSAP	AR(3) model	$\phi_1=.060325$ $\phi_2=-.022255$ $\phi_3=-.404828$	445167000
RSAG(By ADDR)	AR(1) model	$\phi_1=.190761$	364569000
RSAG(By TN)	white noise	-	990114000
Overall	white noise	-	269287000

Of the five models, two exhibited significant autocorrelation. The DSAP data was found to follow a third order autoregressive series. The RSAG(By ADDR) data, on the other hand appeared to follow a first order autoregressive series. The other three models (ATLAS, RSAG(By TN) and the overall series) did not exhibit significant autocorrelation and seemed to follow white noises processes.

The residuals of each series were tested under the Ljung-Box and McLeod-Li portmanteau tests of independence. These tests of independence assume independent data under the null hypothesis and are approximately chi-squared with twenty degrees of freedom. The results of these tests are provided in Table 3.

Table 3 - Tests of Independence

System	Ljung-Box test statistic	P-value (percent)	McLeod-Li test statistic	P-value (percent)
ATLAS	10.2920	96.2563	9.9157	96.9675
DSAP	11.0990	94.3615	30.2100	14.3468
RSAG(By ADDR)	22.4690	31.5613	11.6140	94.9457
RSAG(By TN)	9.9545	96.8989	2.2344	100.0000
Overall	17.6380	61.1241	13.9300	83.4027

From the results, it can be seen that the claim of independence under the null hypothesis was not rejected, and thus we believe the residuals of the differences behave as if they can be treated as independent.

For those series with an autocorrelation structure (DSAP and RSAG(By ADDR)), we conducted a generalized least squares analysis to determine the mean and standard error of each series. The generalized least squares approach takes into account the autocorrelation and produces the best linear unbiased estimate, which will result in a standard error less than or equal to the standard error of an ordinary least squares estimate. The series that did not exhibit significant autocorrelation were subjected to a ordinary least squares analysis, which amounted to a paired t-test.

For all five series, we tested under the null hypothesis that the mean of the daily differences is equal to zero, that is to say that the average response intervals are equal for both BellSouth and the CLECs. Based on the magnitude of the test statistic value and the number of observations employed in the calculation, a P-value was derived. The test results and P-values are shown in Table 4.

Table 4 - Test Results

Overall

Month	Test Statistic	df	P-value (percent)
July	0.5396	22	29.7446
August	3.7770	20	0.0592
September	1.2031	21	12.1163

ATLAS

Month	Test Statistic	df	P-value (percent)
July	3.2101	22	0.2017
August	3.2453	20	0.2027
September	3.0683	21	0.2917

DSAP

Month	Test Statistic	df	P-value (percent)
July	3.0418	22	0.2992
August	4.2157	20	0.0212
September	1.9928	21	2.9717

RSAG(By ADDR)

Month	Test Statistic	df	P-value (percent)
July	4.0417	22	0.0272
August	6.5352	20	0.0001
September	5.6244	21	0.0007

RSAG(By TN)

Month	Test Statistic	df	P-value (percent)
July	-0.8686	22	19.7226
August	1.0576	20	15.1419
September	-0.6530	21	26.0422

Of the fifteen test statistics calculated, only two had negative test values and these were quite small. Furthermore, the P-values for the two negative tests were quite large indicating that there was not enough evidence to suggest any significant differences.

References:

Brockwell, Peter J. and Davis, Richard A., *A First Course in Time Series Analysis*, Springer-Verlag New York, Inc., New York, 1995.

Wei, William S., *Time Series Analysis - Univariate and Multivariate Methods*, Addison-Wesley Publishing Company, Inc., Redwood City, California, 1990.

BellSouth Local Competition Operational Readiness - Prepared for the United States Department of Justice, 1997

SAS Institute Inc., *SAS/ETS® User's Guide, Version 6, Second Edition*, Cary, NC: SAS Institute Inc., 1993.

Figure 1 - Individual Time Series of Average OSS Differences - BST minus CLECs

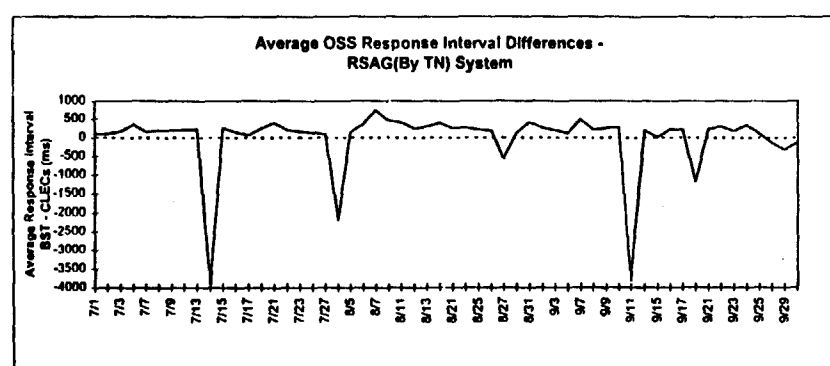
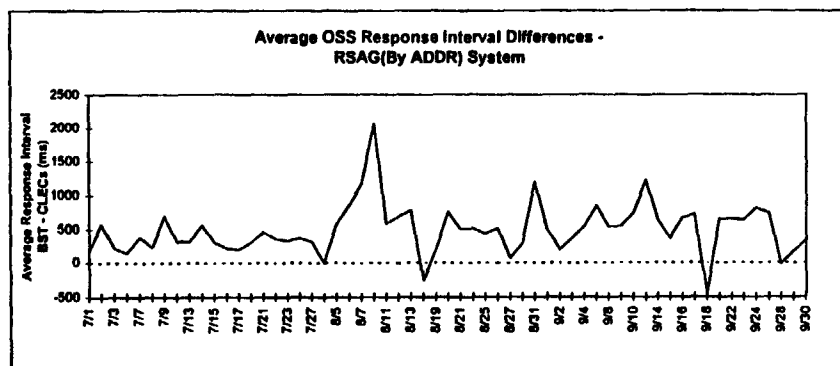
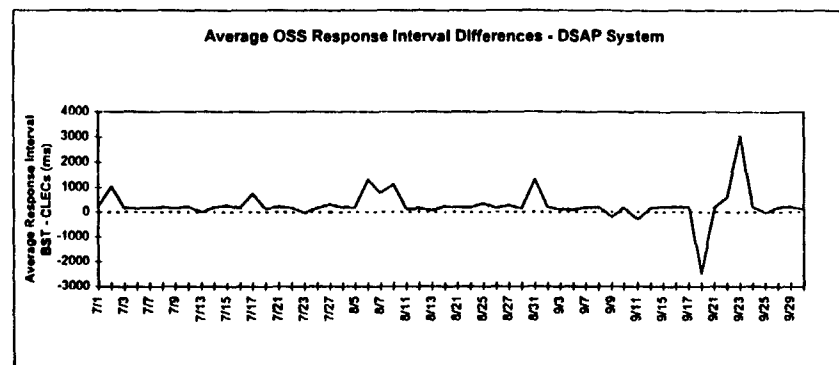
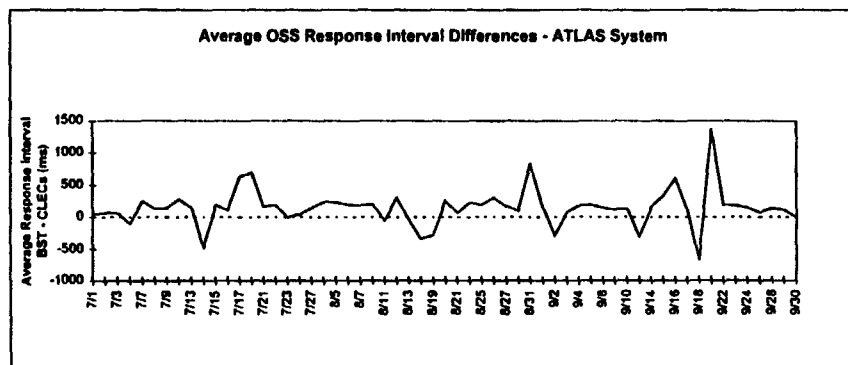
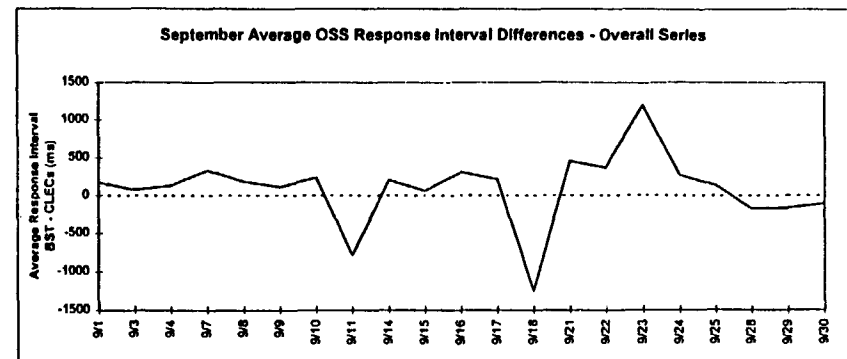
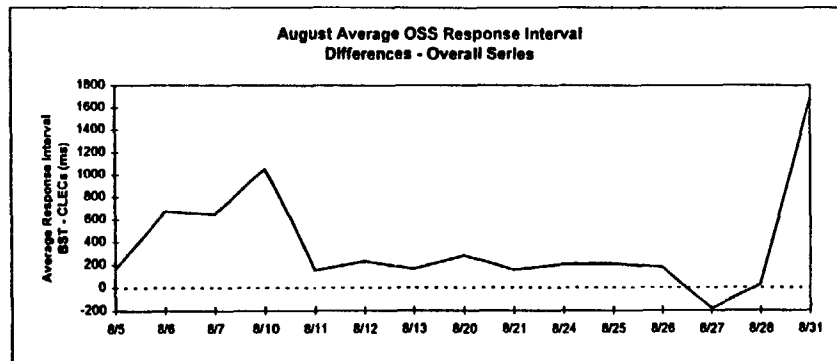
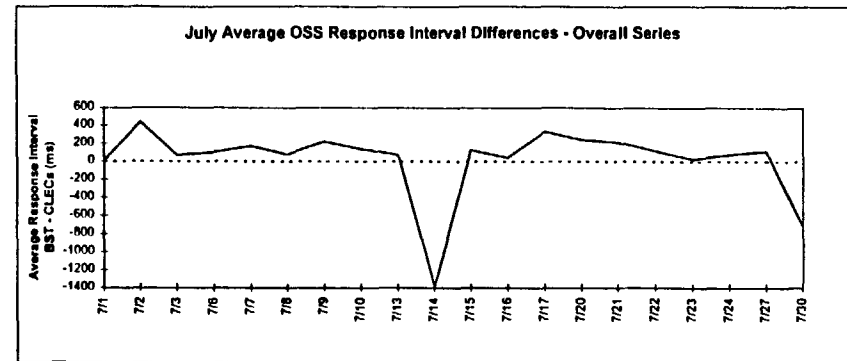
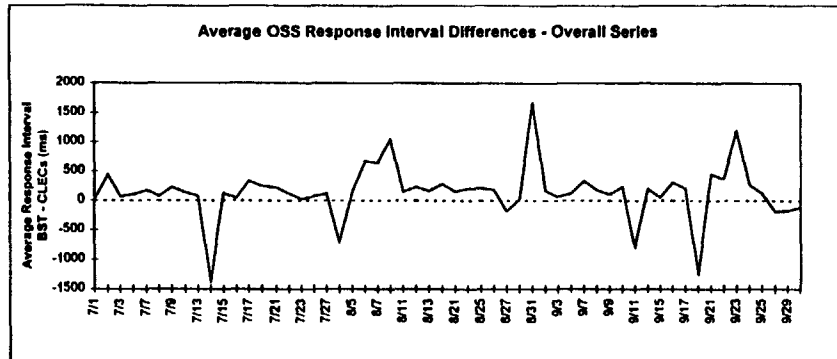


Figure 2 - Overall Time Series of Average OSS Differences - BST minus CLECs



Appendix H
LATA - August Graphics

I. Graphical Representations

OCI: Unadjusted

1. Shreveport.....	H-1
2. Lafayette	H-3
3. New Orleans.....	H-5
4. Baton Rouge.....	H-7

OCI: Adjusted

1. Shreveport.....	H-2
2. Lafayette	H-4
3. New Orleans.....	H-6
4. Baton Rouge.....	H-8

MAD: Unadjusted

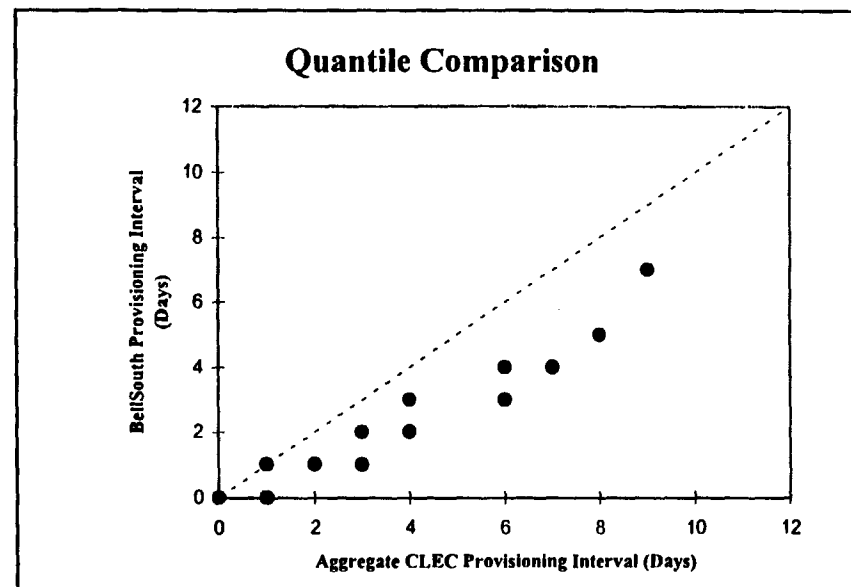
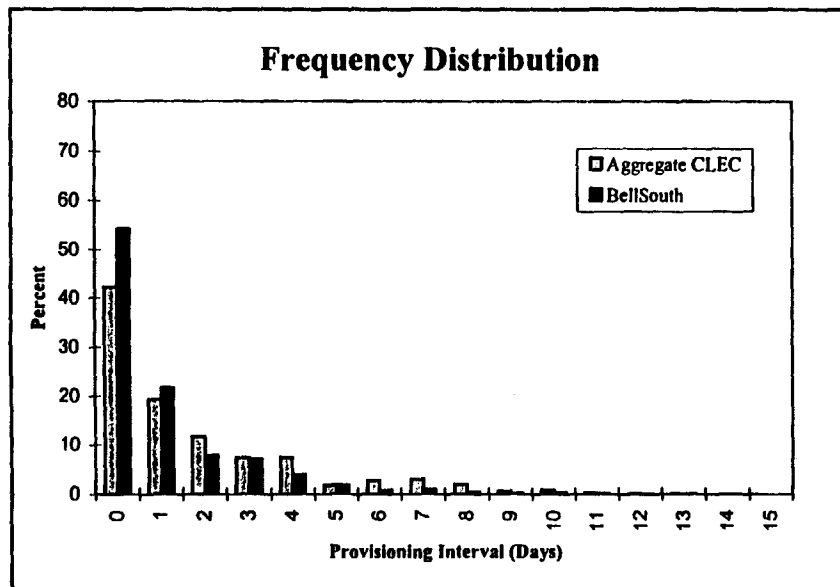
1. Shreveport.....	H-9
2. Lafayette	H-11
3. New Orleans.....	H-13
4. Baton Rouge.....	H-15

MAD: Adjusted

1. Shreveport.....	H-10
2. Lafayette	H-12
3. New Orleans.....	H-14
4. Baton Rouge.....	H-16

II. SQM	H-17
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Unadjusted August BellSouth and CLEC Completion Interval-Provisioning Shreveport Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.16	2.34
CLEC	1.82	2.54
Difference	-0.67	

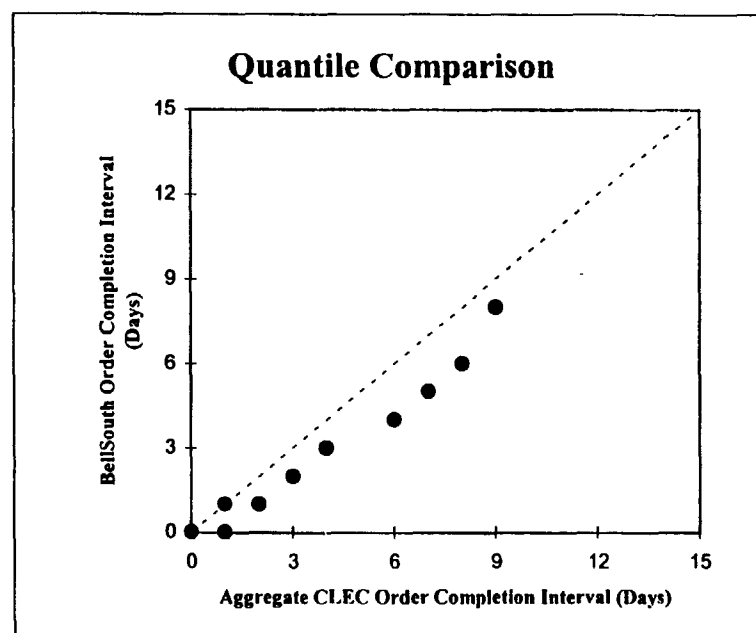
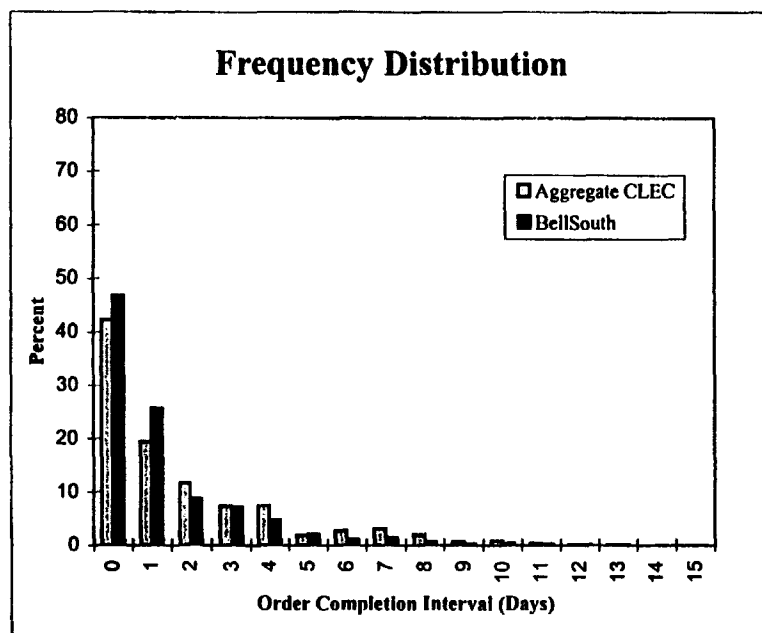
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-19.87	0.0000
FCC	-19.78	0.0000
BST	-5.43	0.0004

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted August BellSouth and CLEC Completion Interval-Provisioning Shreveport Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.41	2.54
CLEC	1.82	2.54
Difference	-0.42	

Analytic Measures

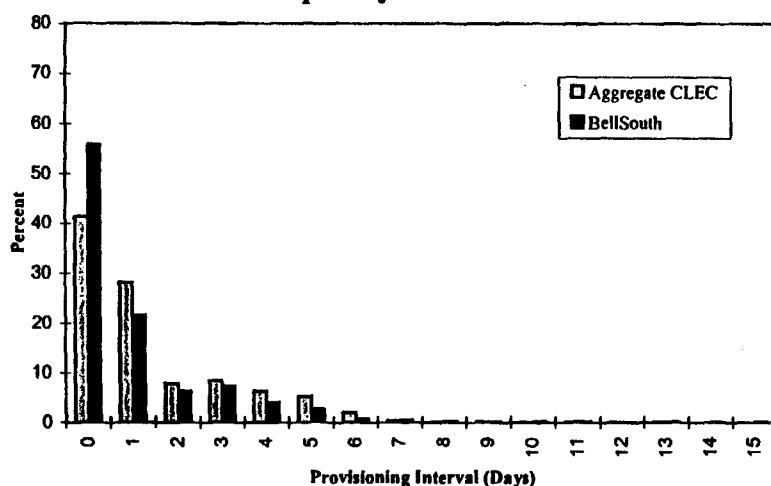
Testing Method	Test Statistic	P-value (percent)
LCUG	-11.44	0.0000
FCC	-11.44	0.0000
BST	-4.54	0.0046

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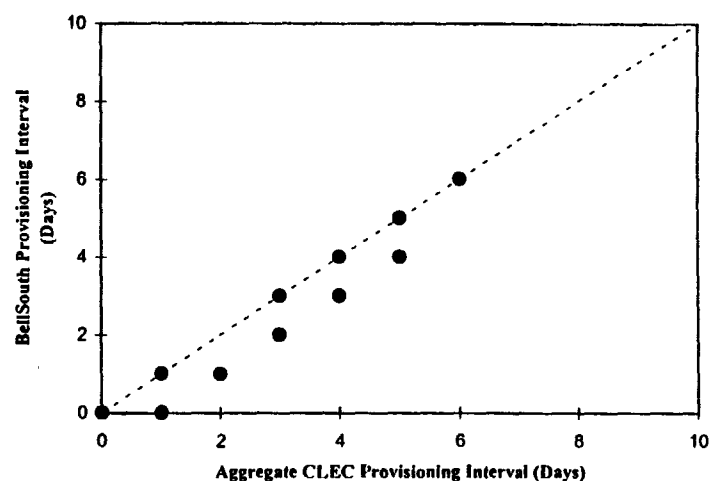
The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted August BellSouth and CLEC Completion Interval-Provisioning Lafayette Cases

Frequency Distribution



Quantile Comparison



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.11	2.31
CLEC	1.38	1.71
Difference	-0.27	

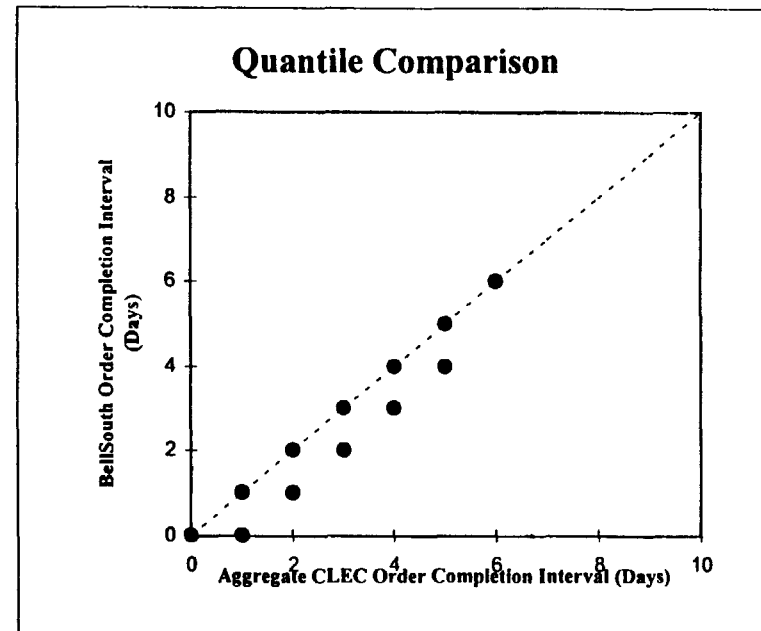
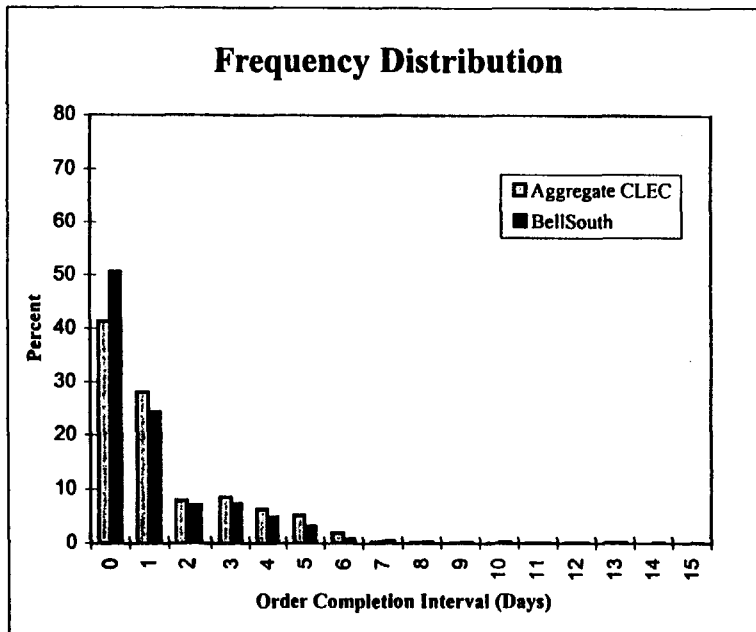
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-6.26	0.0000
FCC	-6.32	0.0000
BST	-2.53	0.8676

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted August BellSouth and CLEC Completion Interval-Provisioning Lafayette Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.21	2.24
CLEC	1.38	1.71
Difference	-0.17	

Analytic Measures

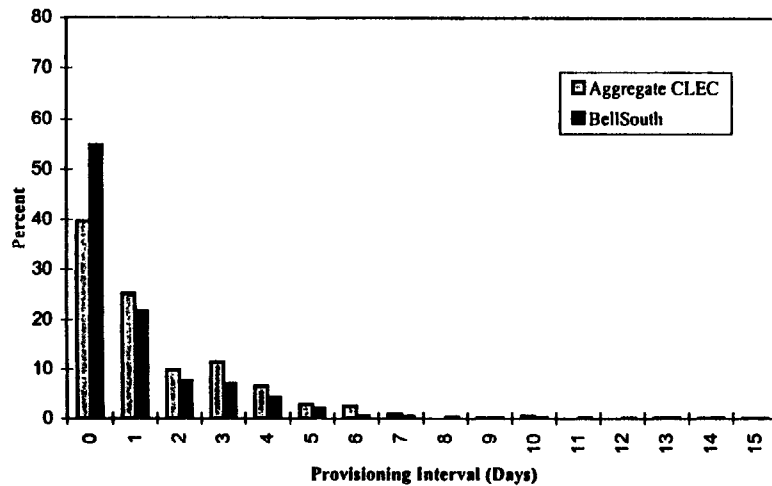
Testing Method	Test Statistic	P-value (percent)
LCUG	-3.99	0.0033
FCC	-4.03	0.0028
BST	-1.62	5.7944

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

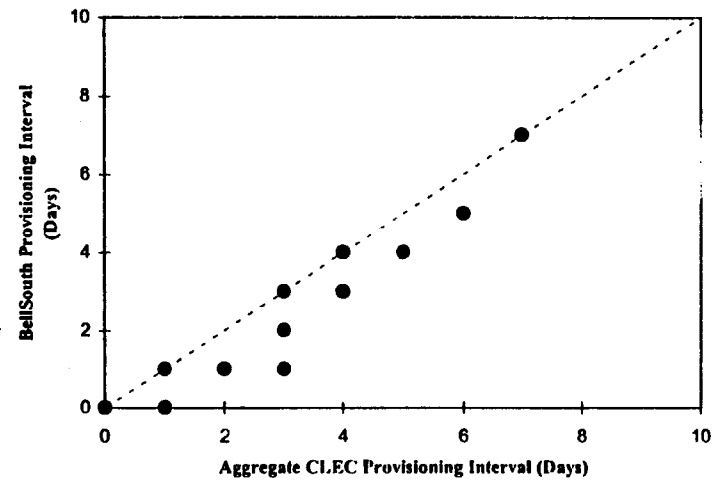
The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted August BellSouth and CLEC Completion Interval-Provisioning New Orleans Cases

Frequency Distribution



Quantile Comparison



Descriptive Measures

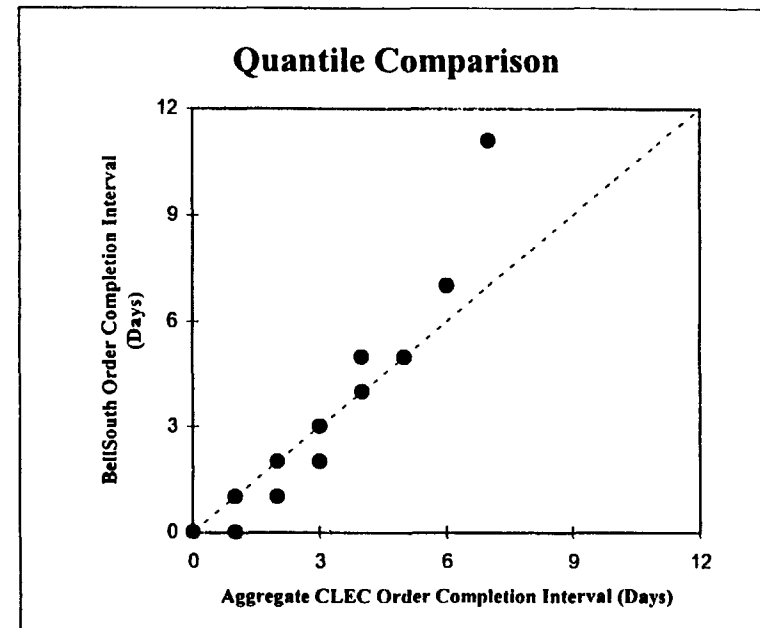
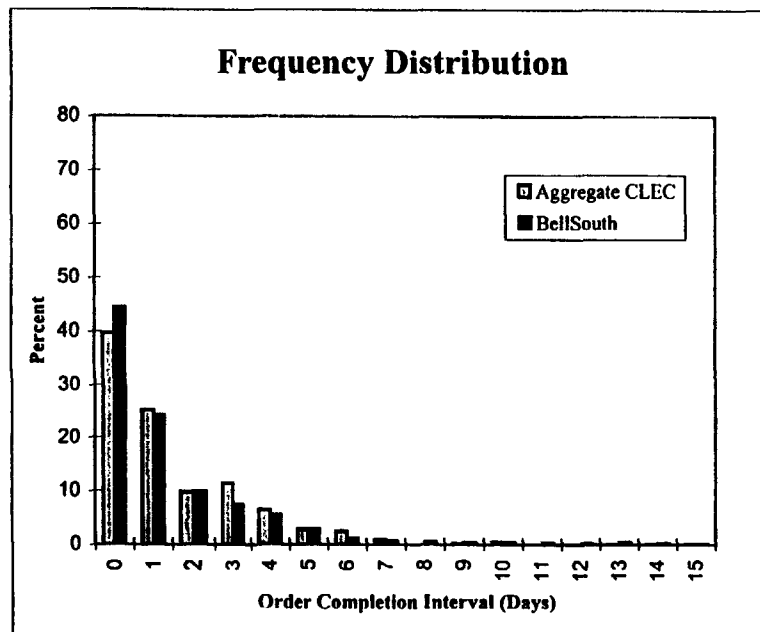
Service Provider	Mean	Standard Deviation
BST	1.21	2.90
CLEC	1.57	2.25
Difference	-0.37	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-9.09	0.0000
FCC	-9.15	0.0000
BST	-5.17	0.0008

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.
The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted August BellSouth and CLEC Completion Interval-Provisioning New Orleans Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.70	3.53
CLEC	1.57	2.25
Difference	0.12	

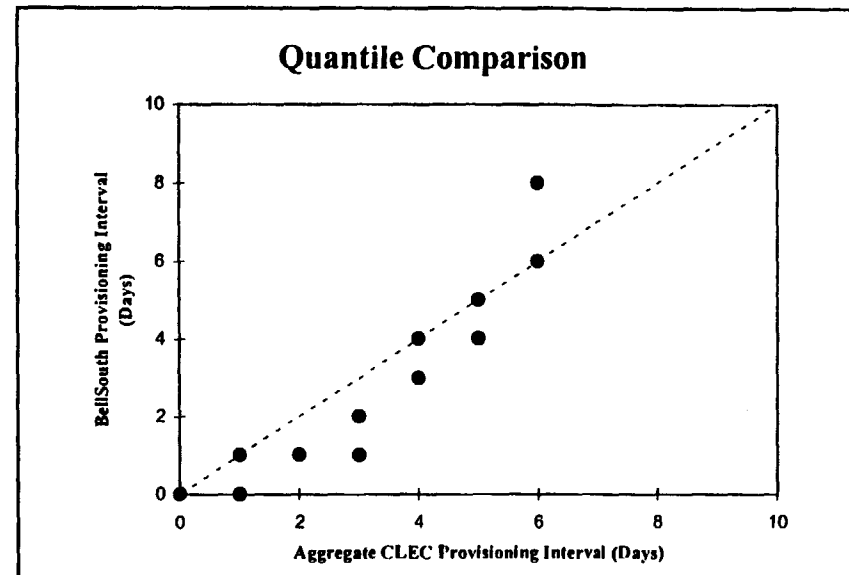
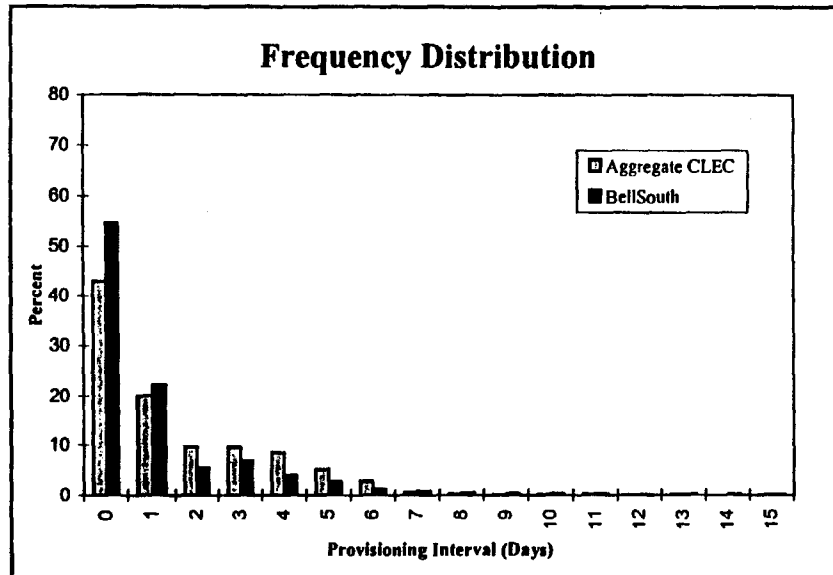
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	2.55	0.5418
FCC	2.57	0.5065
BST	1.93	3.1819

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted August BellSouth and CLEC Completion Interval-Provisioning Baton Rouge Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.35	3.41
CLEC	1.58	2.19
Difference	-0.24	

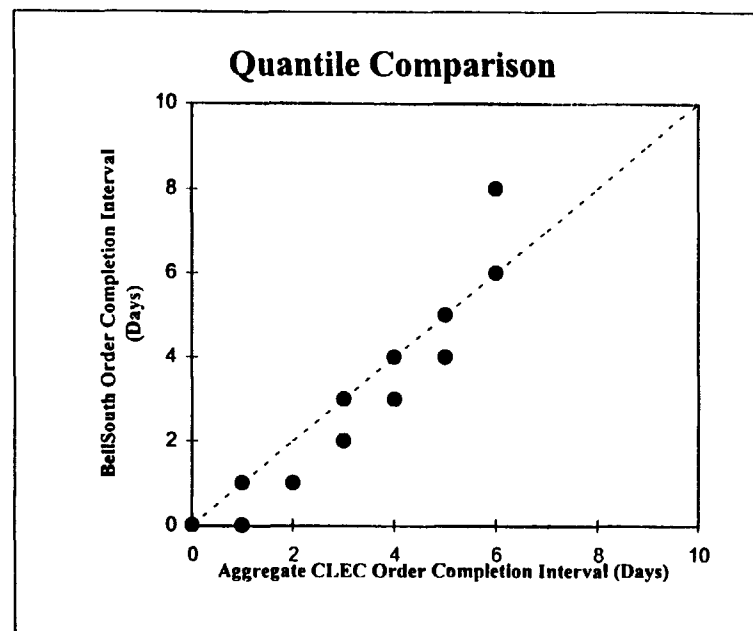
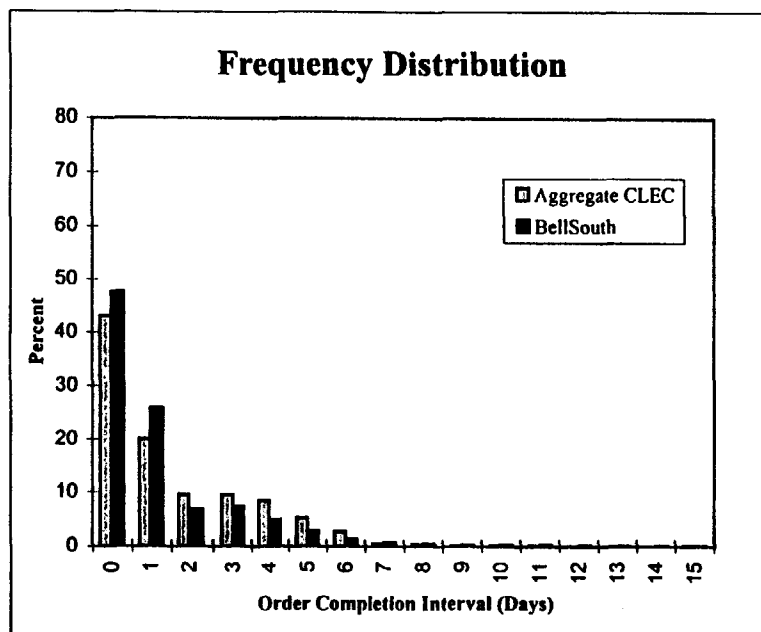
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-3.45	0.0283
FCC	-3.49	0.0245
BST	-1.50	7.3067

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted August BellSouth and CLEC Completion Interval-Provisioning Baton Rouge Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.44	3.00
CLEC	1.58	2.19
Difference	-0.14	

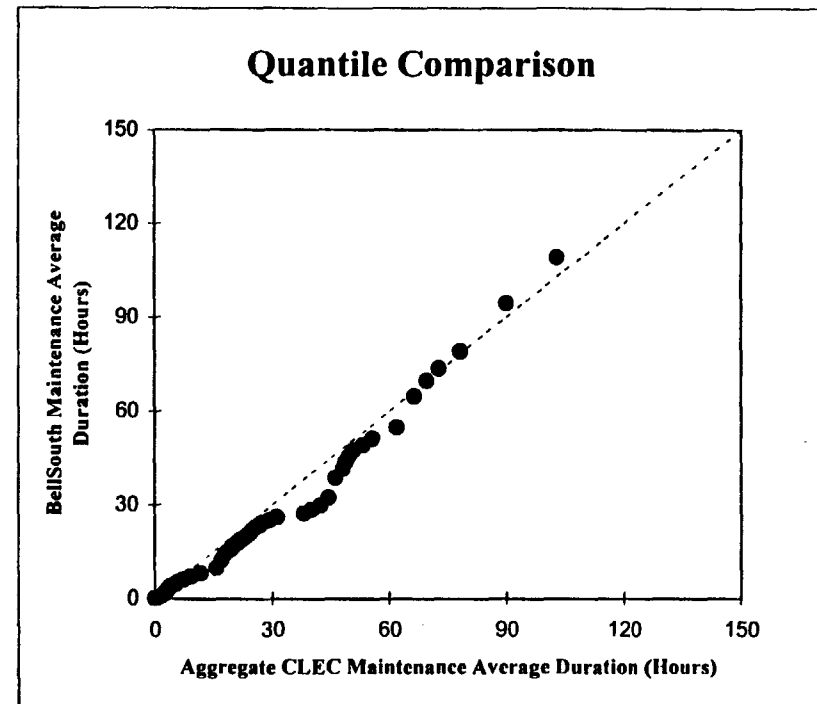
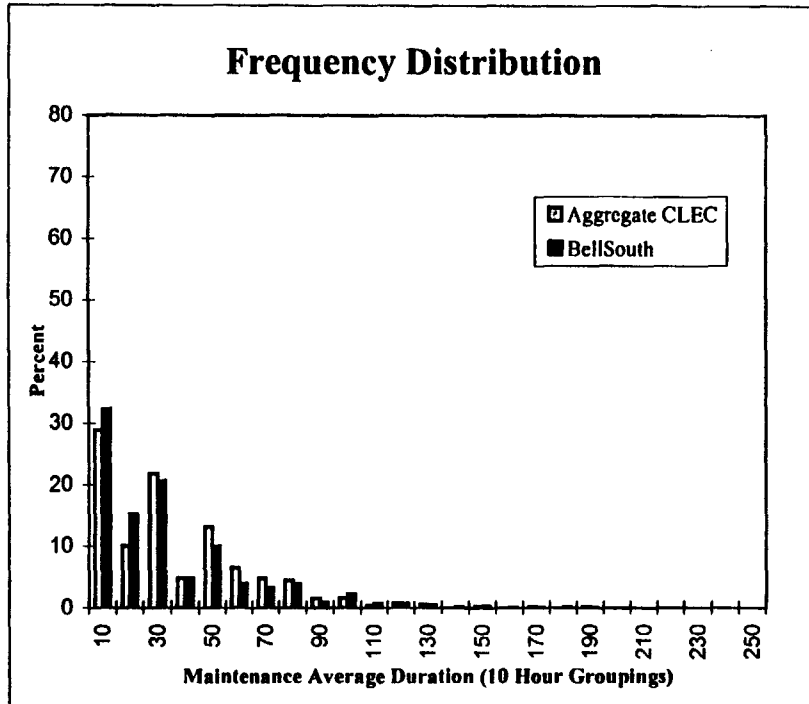
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-2.33	0.9806
FCC	-2.35	0.9268
BST	-0.78	22.0778

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted August BellSouth and CLEC Average Duration-Maintenance Shreveport



Descriptive Measures

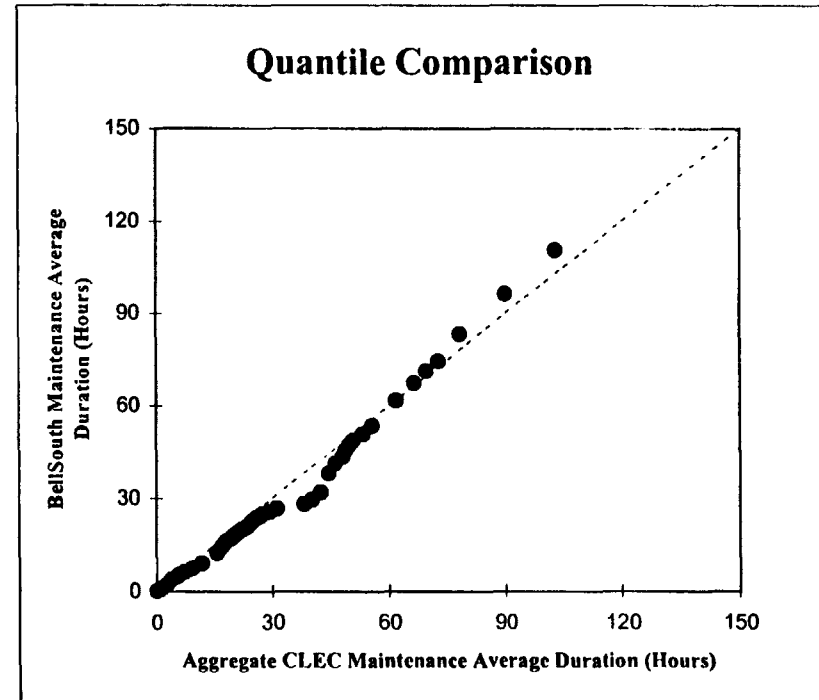
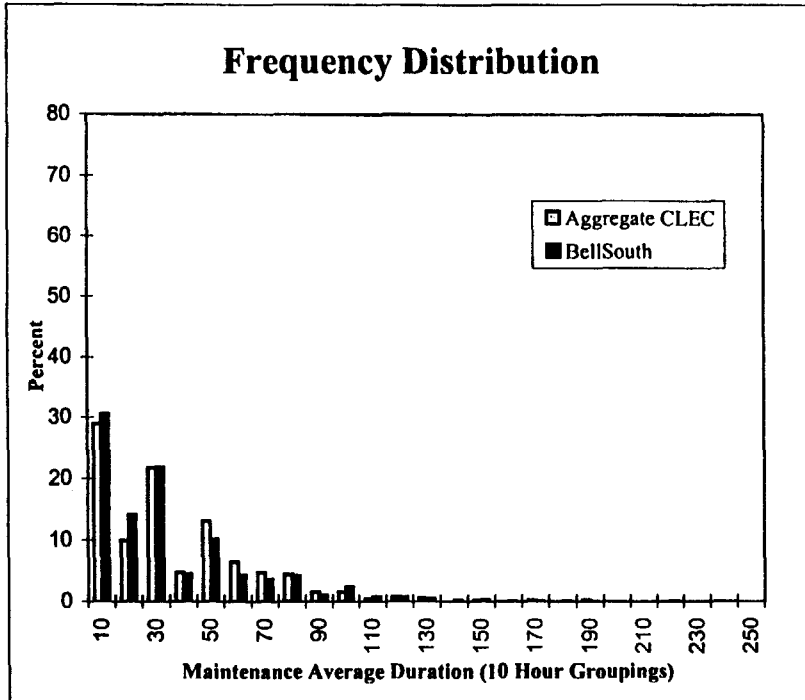
Service Provider	Mean	Standard Deviation
BST	28.16	28.59
CLEC	31.48	28.47
Difference	-3.32	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-2.61	0.4546
FCC	-2.61	0.4542
BST	-1.73	4.7365

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted August BellSouth and CLEC Average Duration-Maintenance Shreveport



Descriptive Measures

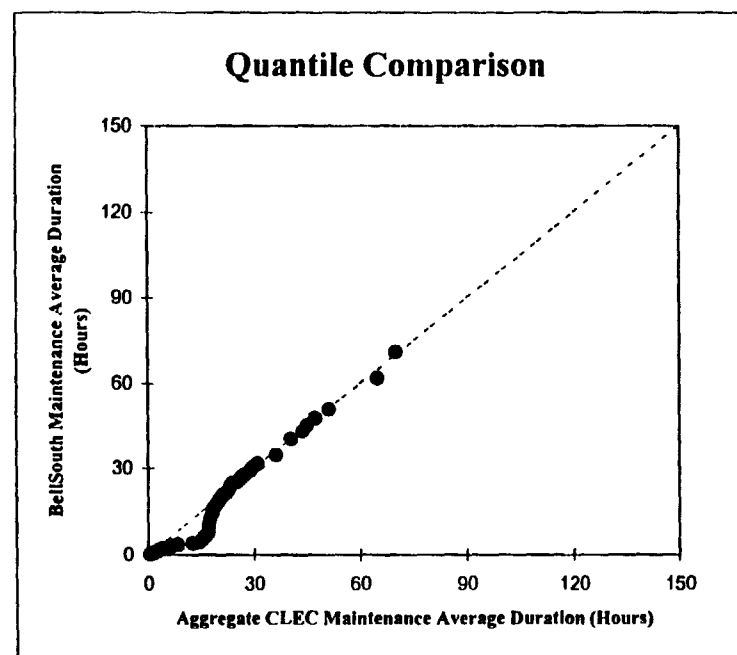
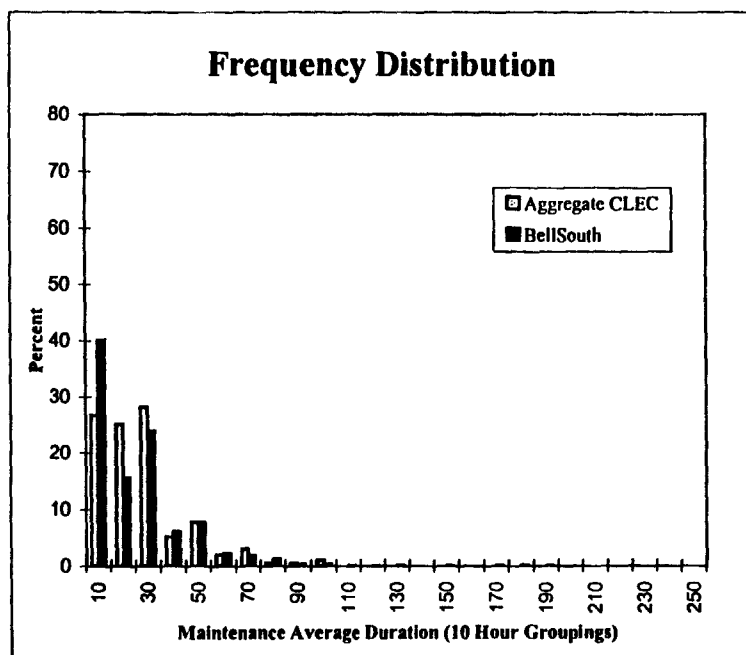
Service Provider	Mean	Standard Deviation
BST	29.48	29.34
CLEC	31.48	28.47
Difference	-2.00	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-1.53	6.3200
FCC	-1.53	6.3058
BST	-1.20	12.0398

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted August BellSouth and CLEC Average Duration-Maintenance Lafayette



Descriptive Measures

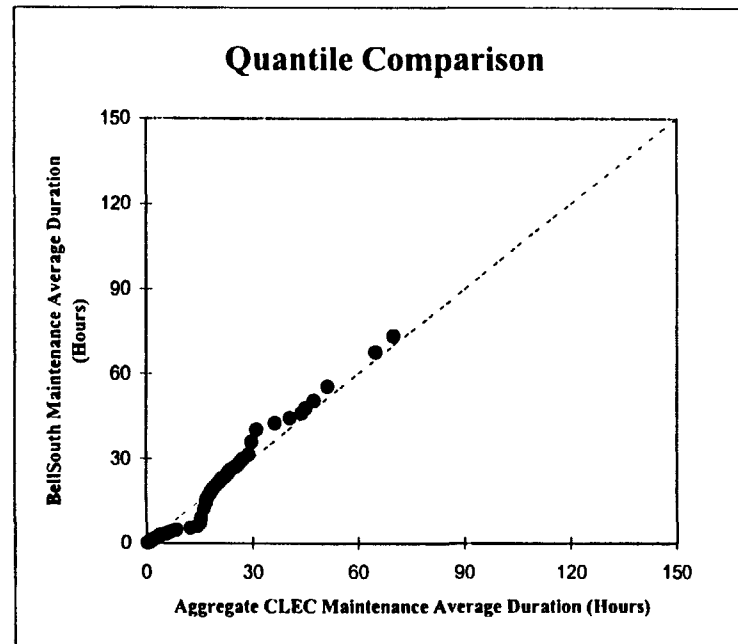
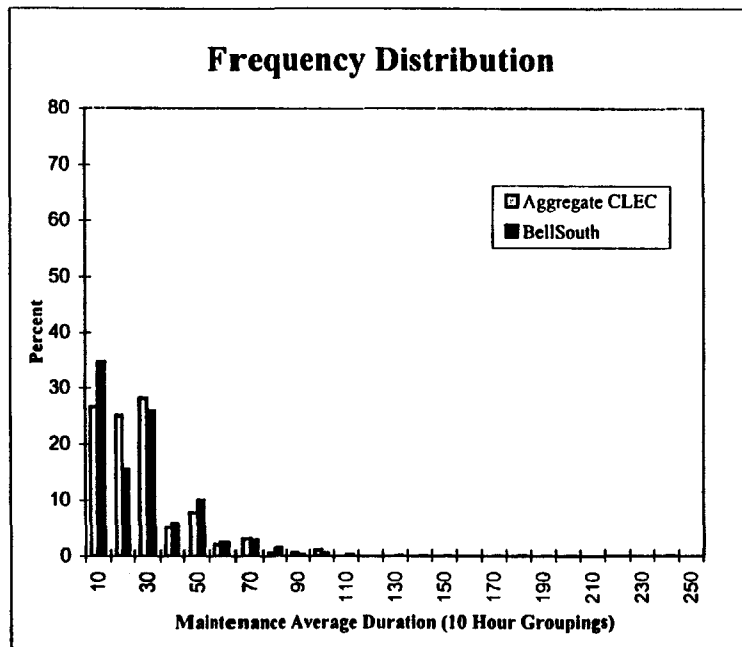
Service Provider	Mean	Standard Deviation
BST	19.66	19.95
CLEC	21.93	17.99
Difference	-2.27	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-1.57	5.7690
FCC	-1.58	5.7438
BST	-1.92	3.3402

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted August BellSouth and CLEC Average Duration-Maintenance Lafayette



Descriptive Measures

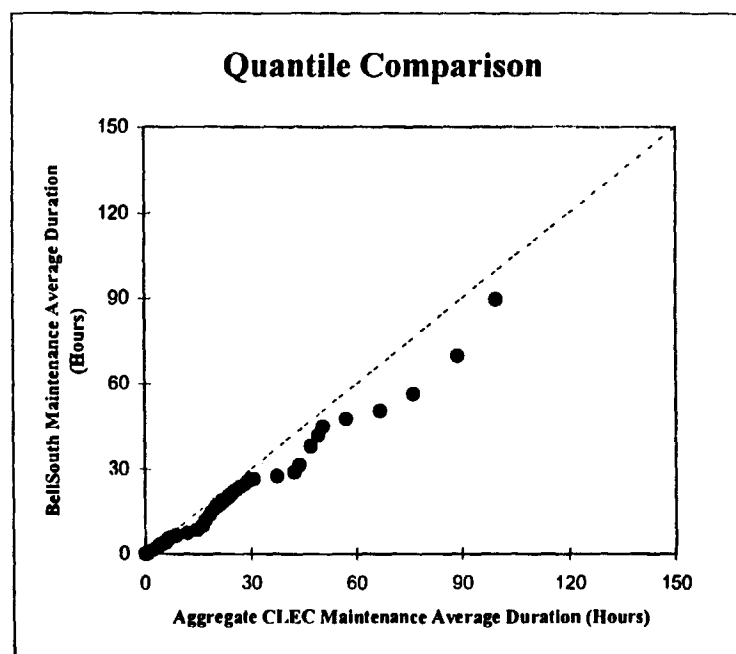
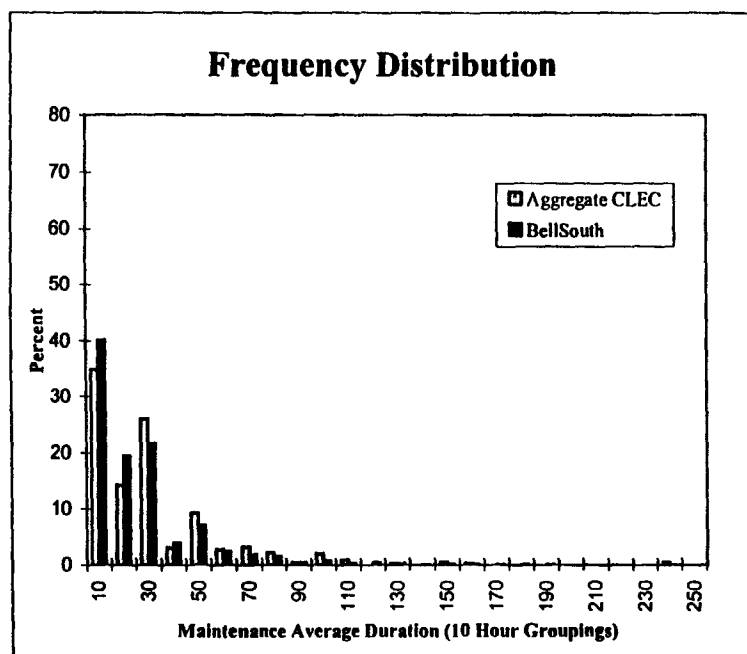
Service Provider	Mean	Standard Deviation
BST	22.21	21.24
CLEC	21.93	17.99
Difference	0.28	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	0.18	42.7508
FCC	0.18	42.7358
BST	0.16	43.8402

Data used in analysts includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted August BellSouth and CLEC Average Duration-Maintenance New Orleans



Descriptive Measures

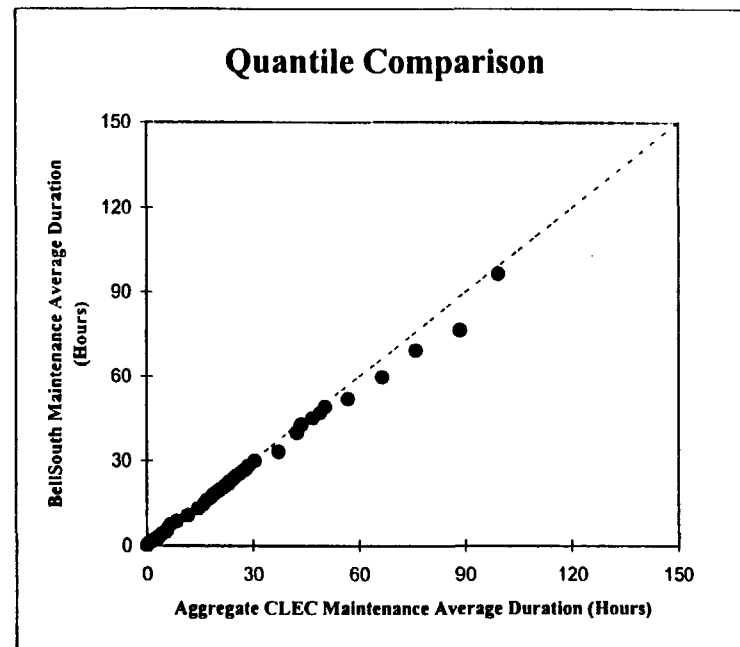
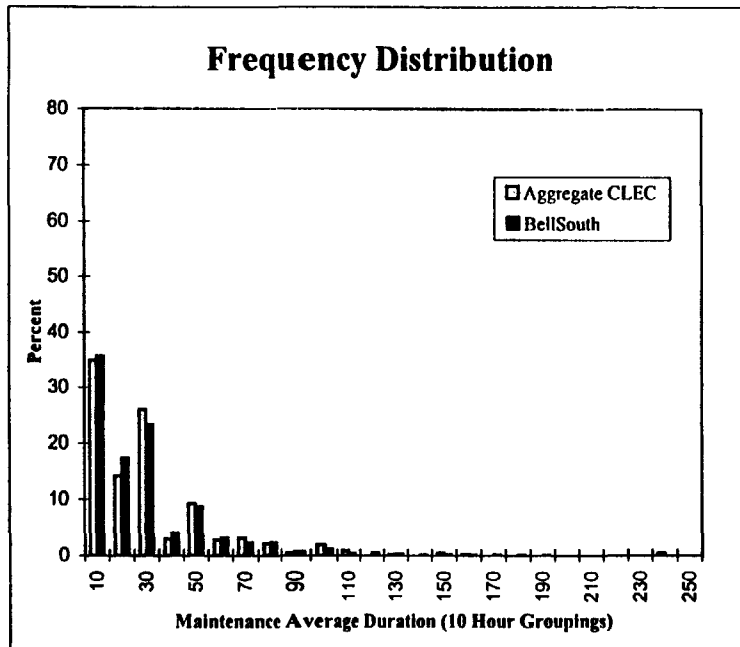
Service Provider	Mean	Standard Deviation
BST	20.24	22.72
CLEC	25.55	28.81
Difference	-5.31	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-5.00	0.0000
FCC	-4.97	0.0000
BST	-3.32	0.1233

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted August BellSouth and CLEC Average Duration-Maintenance New Orleans



Descriptive Measures

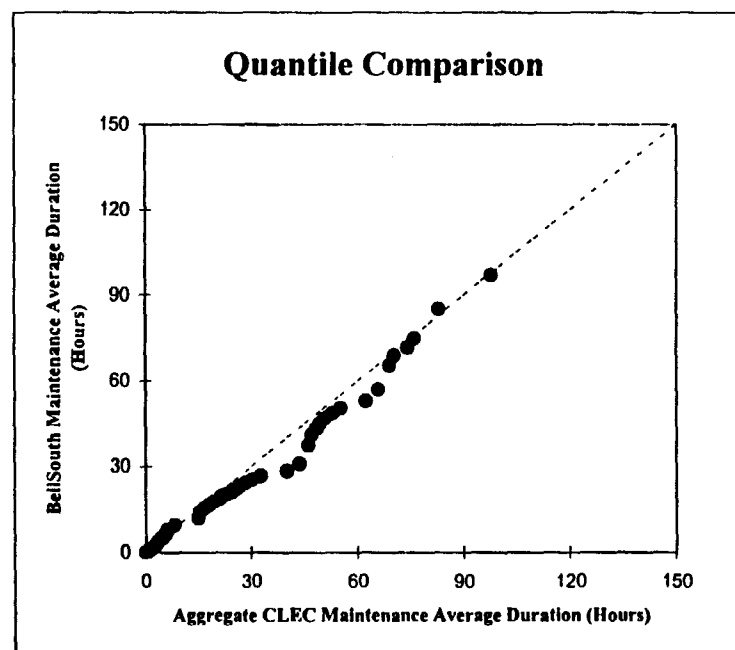
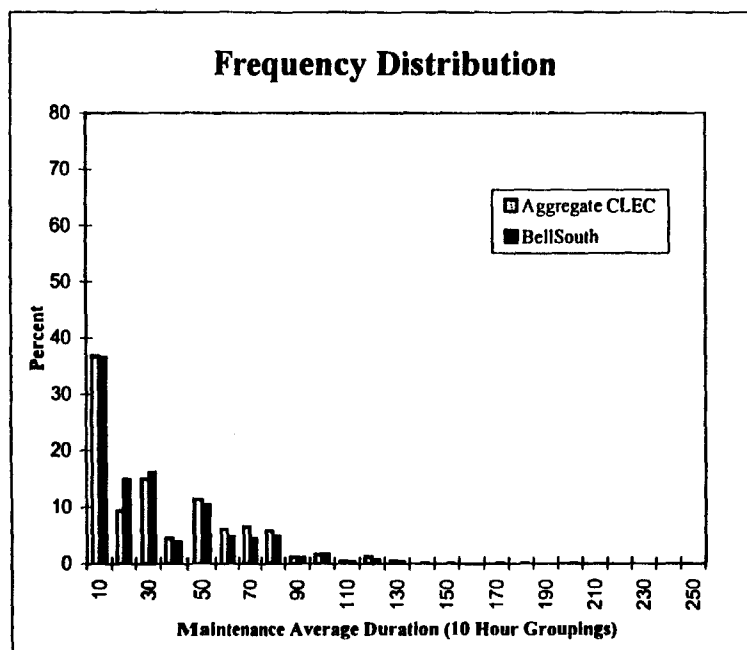
Service Provider	Mean	Standard Deviation
BST	23.58	25.06
CLEC	25.55	28.81
Difference	-1.97	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-1.68	4.6442
FCC	-1.68	4.6897
BST	-1.57	6.4115

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted August BellSouth and CLEC Average Duration-Maintenance Baton Rouge



Descriptive Measures

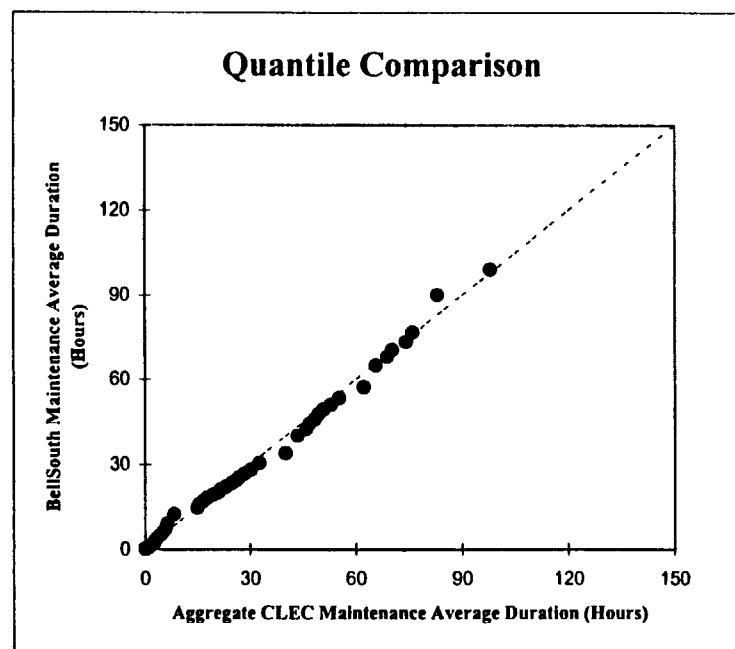
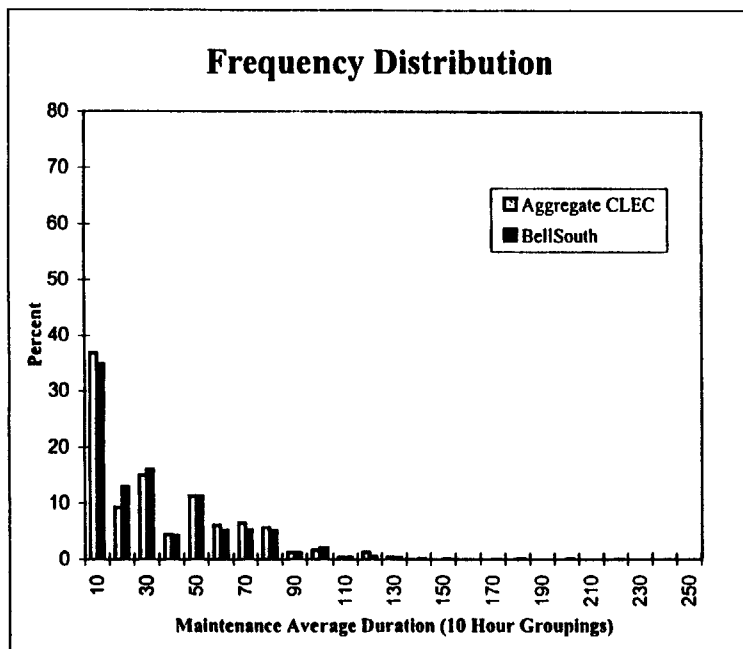
Service Provider	Mean	Standard Deviation
BST	27.02	27.53
CLEC	29.76	28.20
Difference	-2.74	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-1.55	6.1050
FCC	-1.55	6.1143
BST	-0.96	17.5778

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted August BellSouth and CLEC Average Duration-Maintenance Baton Rouge



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	29.25	28.98
CLEC	29.76	28.20
Difference	-0.51	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-0.27	39.2847
FCC	-0.27	39.2790
BST	-0.24	40.8240

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Appendix I

LATA - September Graphics

I. Graphical Representations

OCI: Unadjusted

1. Shreveport.....	I-1
2. Lafayette	I-3
3. New Orleans.....	I-5
4. Baton Rouge.....	I-7

MAD: Unadjusted

1. Shreveport.....	I-9
2. Lafayette	I-11
3. New Orleans.....	I-13
4. Baton Rouge.....	I-15

OCI: Adjusted

1. Shreveport.....	I-2
2. Lafayette	I-4
3. New Orleans.....	I-6
4. Baton Rouge.....	I-8

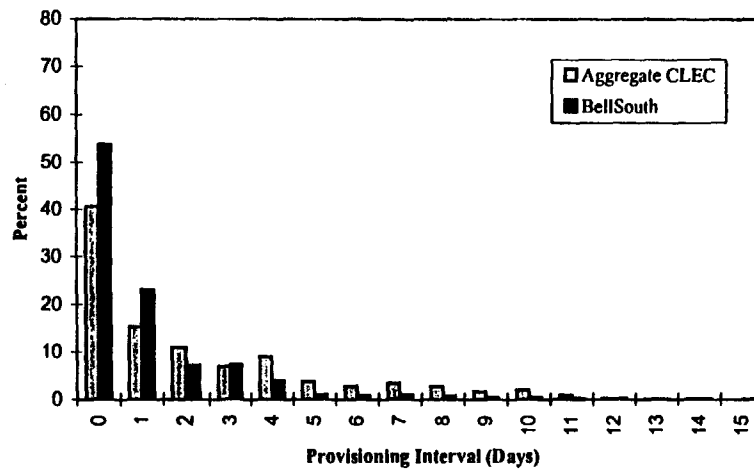
MAD: Adjusted

1. Shreveport.....	I-10
2. Lafayette	I-12
3. New Orleans.....	I-14
4. Baton Rouge.....	I-16

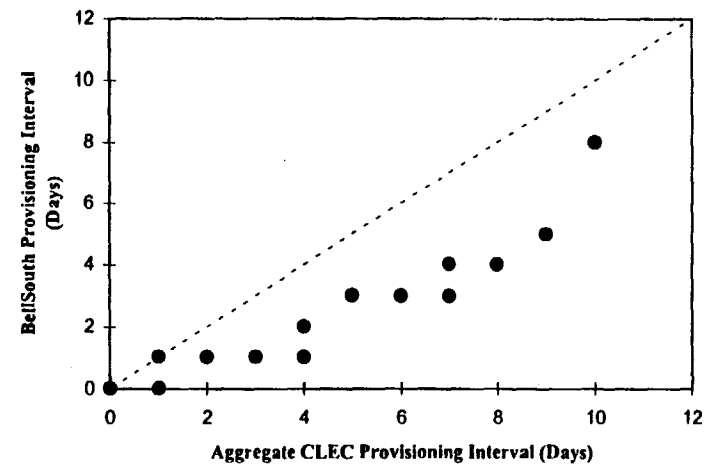
II. SQM.....	I-17
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Unadjusted September BellSouth and CLEC Completion Interval-Provisioning Shreveport Cases

Frequency Distribution



Quantile Comparison



Descriptive Measures

Service Provider	Mean	Standard Deviation
BellSouth	1.19	2.49
CLEC Aggregate	2.23	2.88
Difference	-1.04	

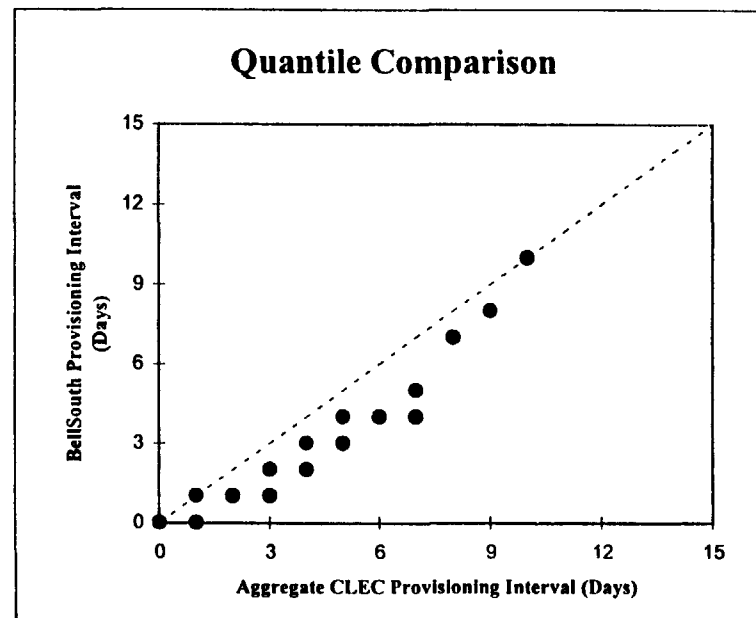
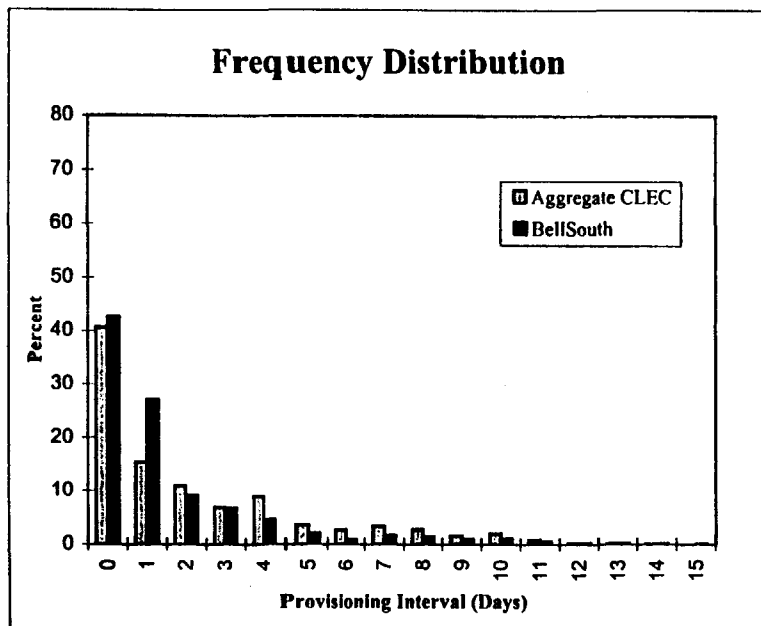
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-29.65	0.0000
FCC	-29.38	0.0000
BST	-6.93	0.0000

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted September BellSouth and CLEC Completion Interval-Provisioning Shreveport Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.70	3.00
CLEC	2.23	2.88
Difference	-0.53	

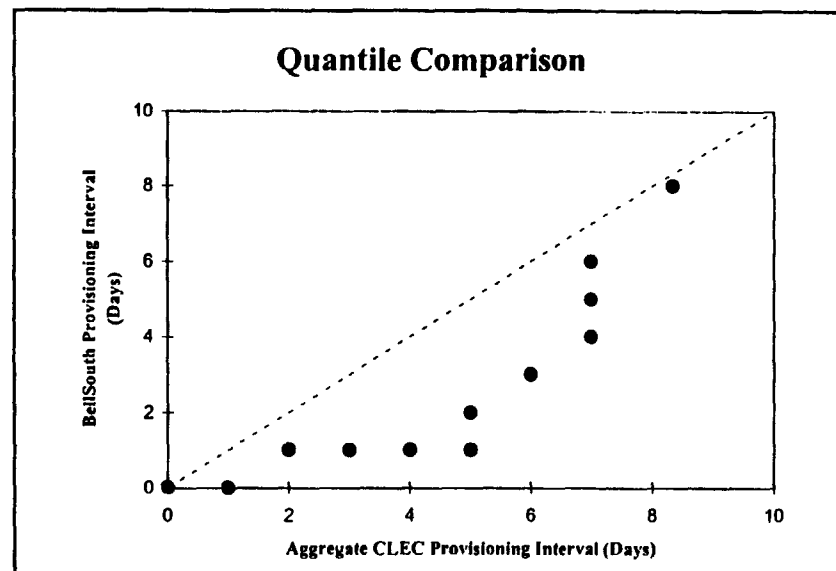
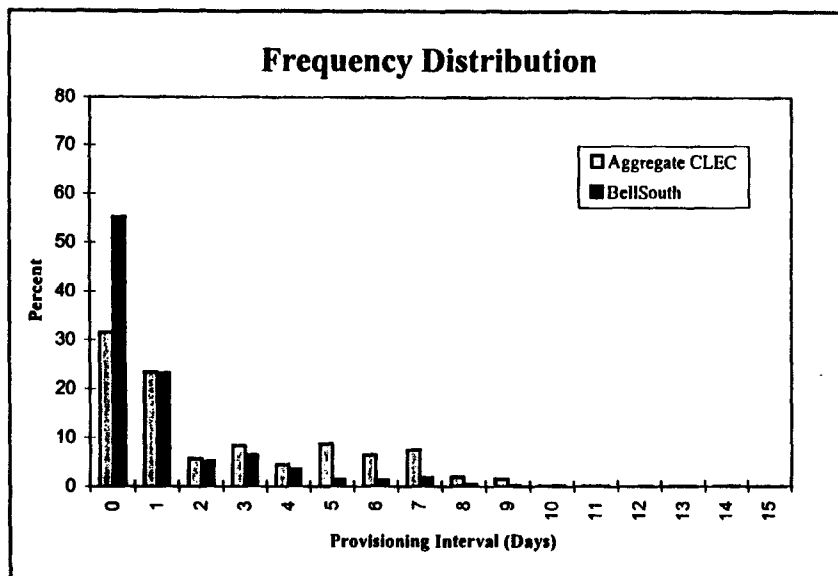
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-12.53	0.0000
FCC	-12.56	0.0000
BST	-4.18	0.0121

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted September BellSouth and CLEC Completion Interval-Provisioning Lafayette Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BellSouth	1.27	2.97
CLEC Aggregate	2.48	2.73
Difference	-1.22	

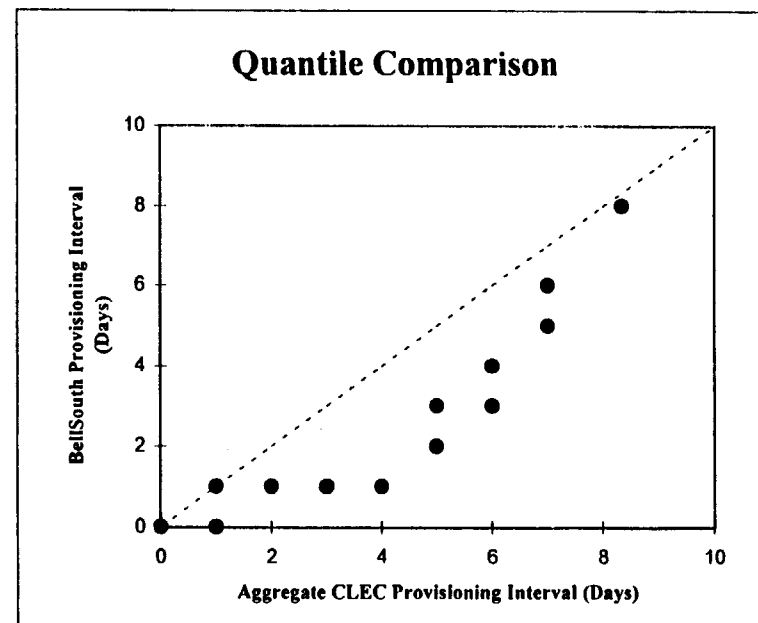
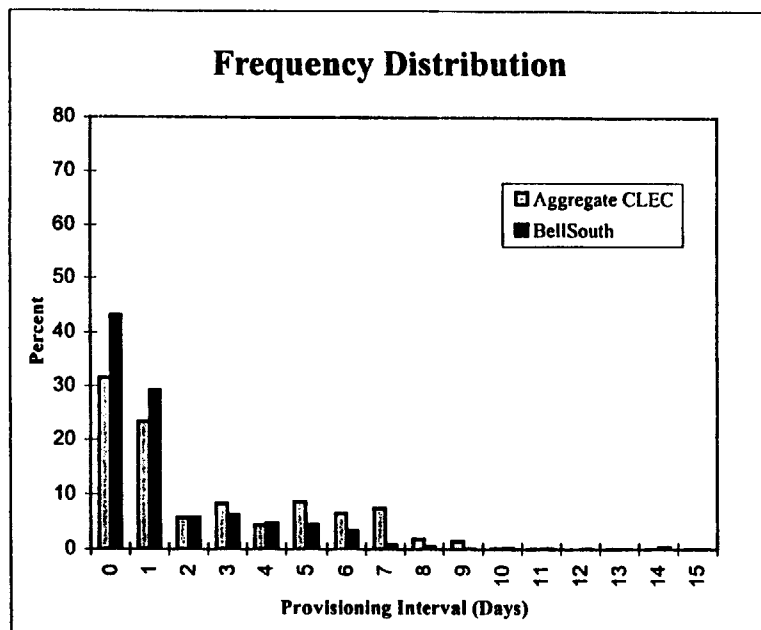
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-20.18	0.0000
FCC	-20.24	0.0000
BST	-8.82	0.0000

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted September BellSouth and CLEC Completion Interval-Provisioning Lafayette Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.56	2.59
CLEC	2.48	2.73
Difference	-0.93	

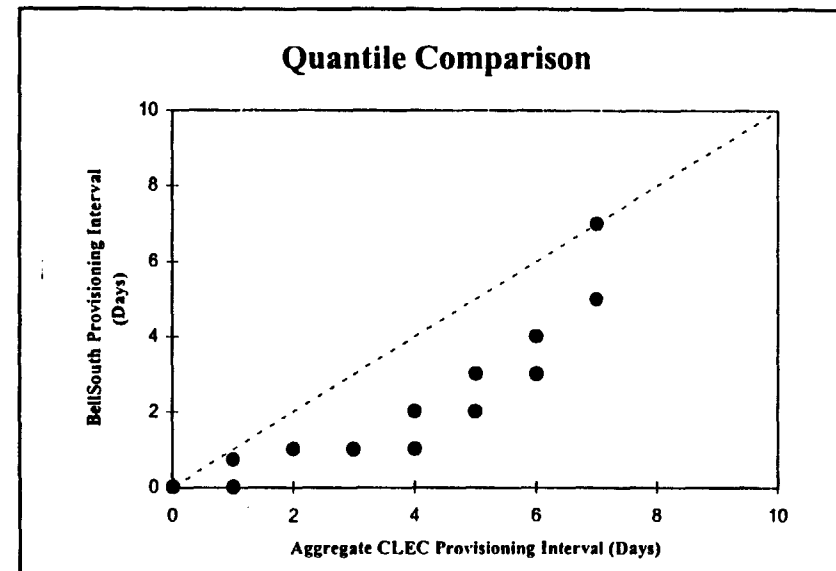
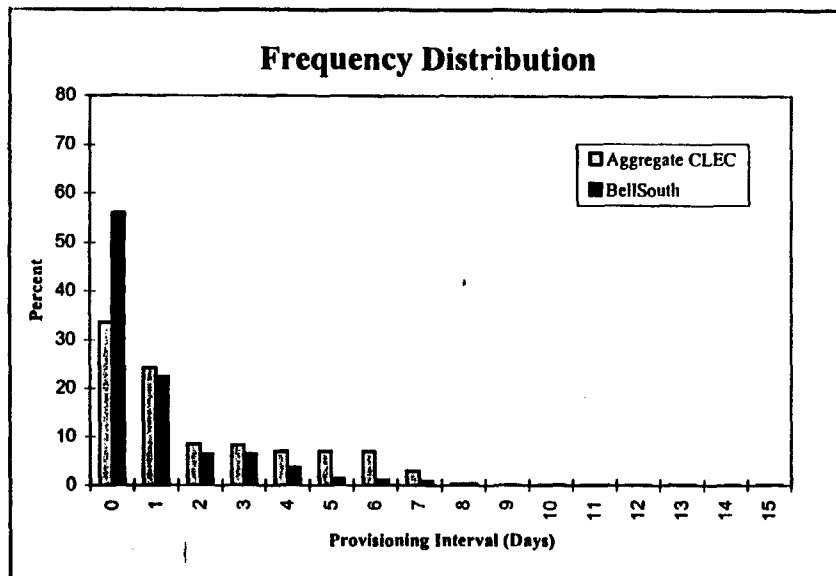
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-17.69	0.0000
FCC	-17.64	0.0000
BST	-4.69	0.0030

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted September BellSouth and CLEC Completion Interval-Provisioning New Orleans Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BellSouth	1.19	2.88
CLEC Aggregate	2.17	2.98
Difference	-0.98	

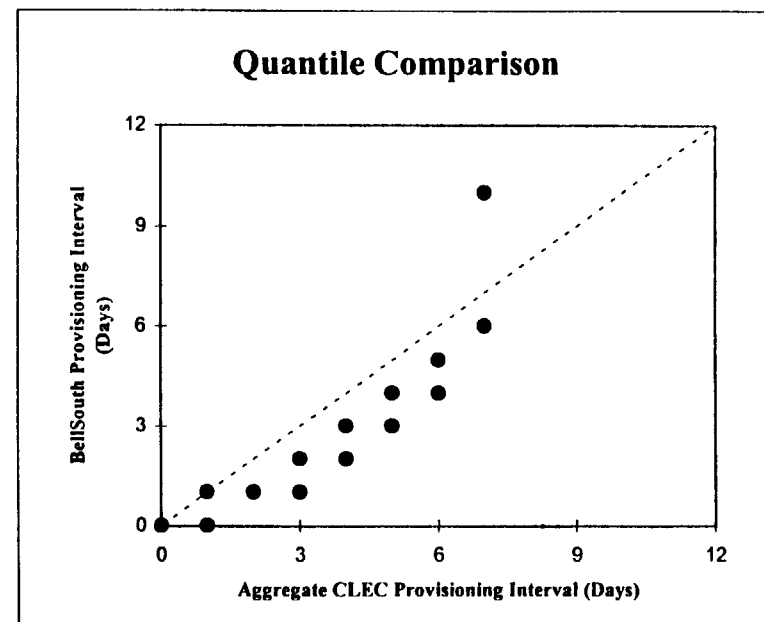
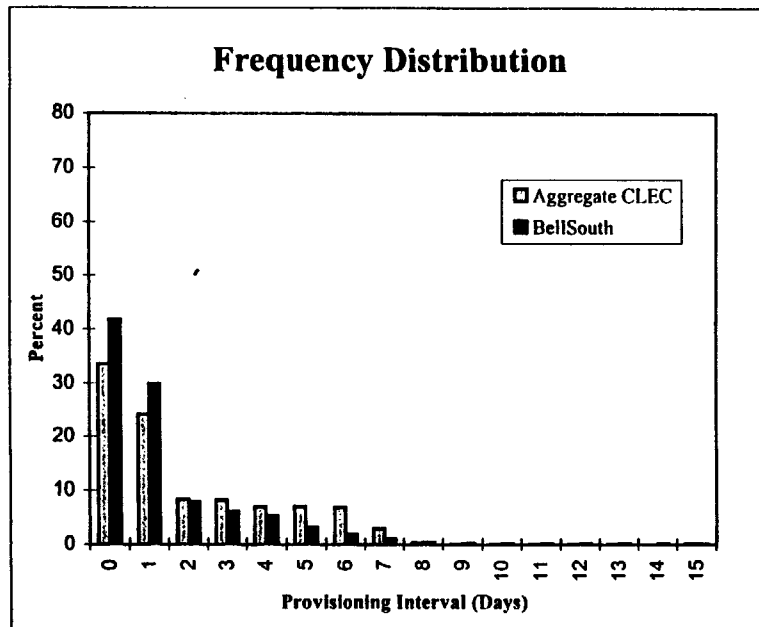
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-24.48	0.0000
FCC	-24.45	0.0000
BST	-12.18	0.0000

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted September BellSouth and CLEC Completion Interval-Provisioning New Orleans Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.64	3.30
CLEC	2.17	2.98
Difference	-0.53	

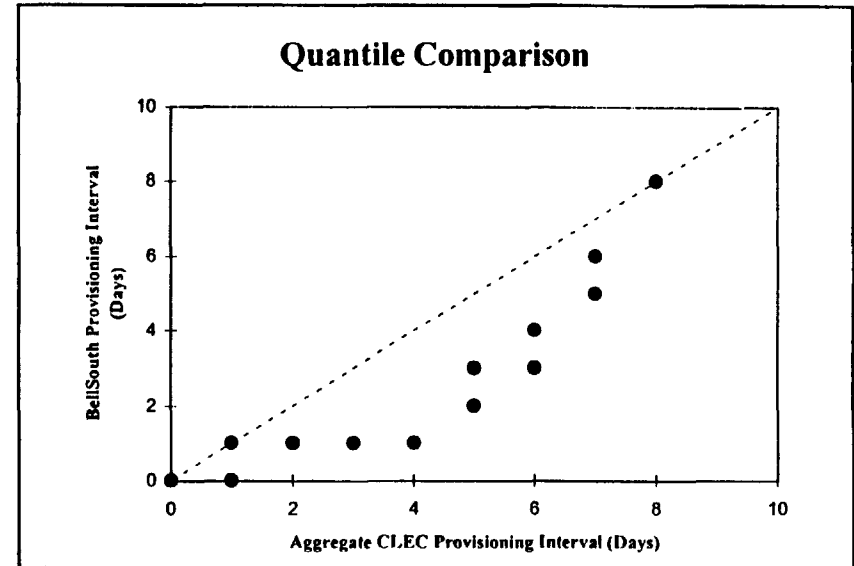
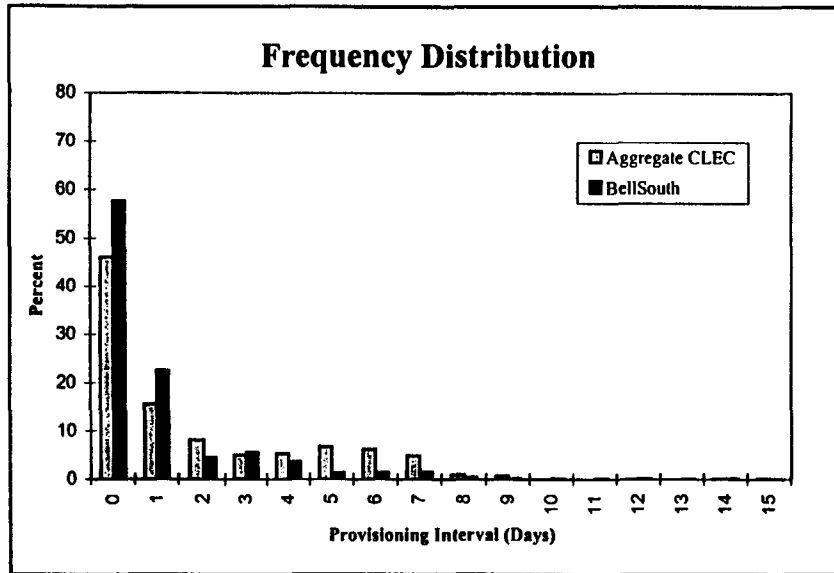
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-11.54	0.0000
FCC	-11.57	0.0000
BST	-6.59	0.0000

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted September BellSouth and CLEC Completion Interval-Provisioning Baton Rouge Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BellSouth	1.17	2.82
CLEC Aggregate	1.95	2.64
Difference	-0.78	

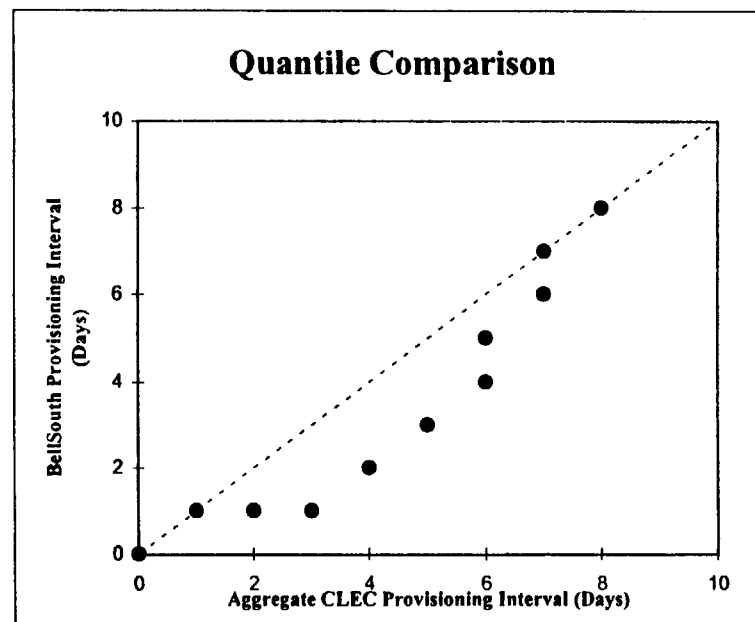
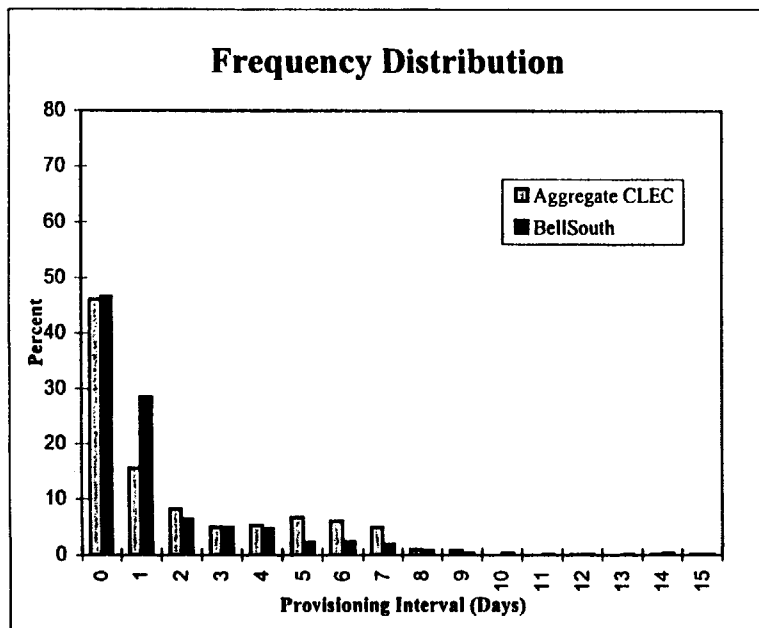
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-14.65	0.0000
FCC	-14.70	0.0000
BST	-4.06	0.0262

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Adjusted September BellSouth and CLEC Completion Interval-Provisioning Baton Rouge Cases



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	1.45	2.62
CLEC	1.95	2.64
Difference	-0.50	

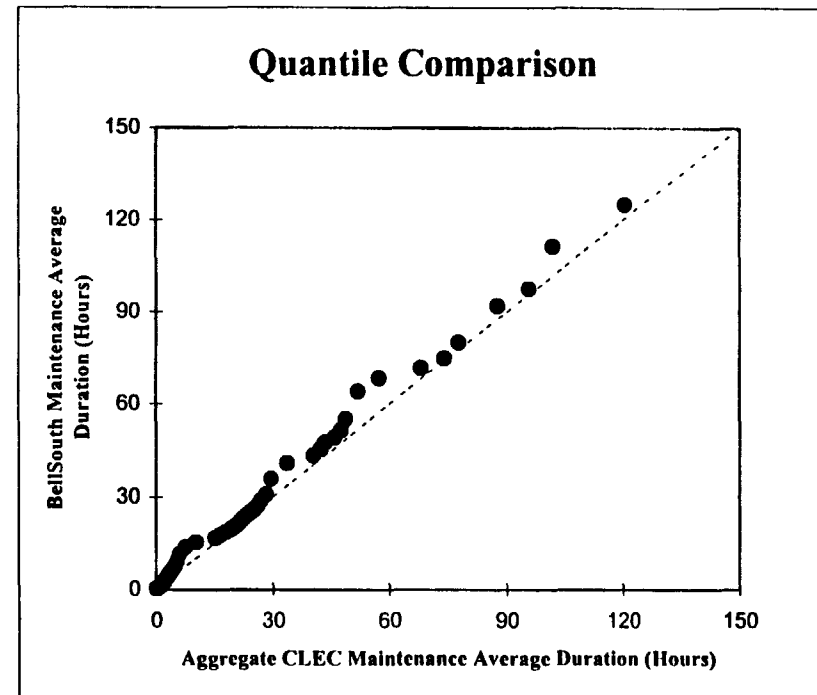
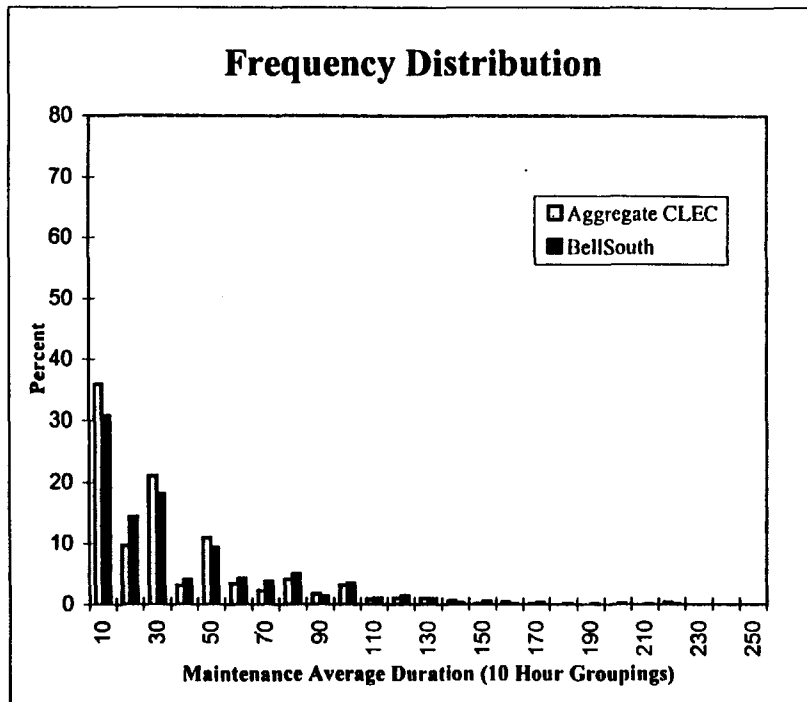
Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-10.08	0.0000
FCC	-10.07	0.0000
BST	-3.15	0.2350

Data used in analysis does not include any records with missed appointments due to customer rescheduling or records corresponding to official services.

The application of statistical trimming removed records with completion interval-provisioning of above 99 days. This resulted in the removal of no CLEC records and 0.004% of the BellSouth records.

Unadjusted September BellSouth and CLEC Average Duration-Maintenance Shreveport



Descriptive Measures

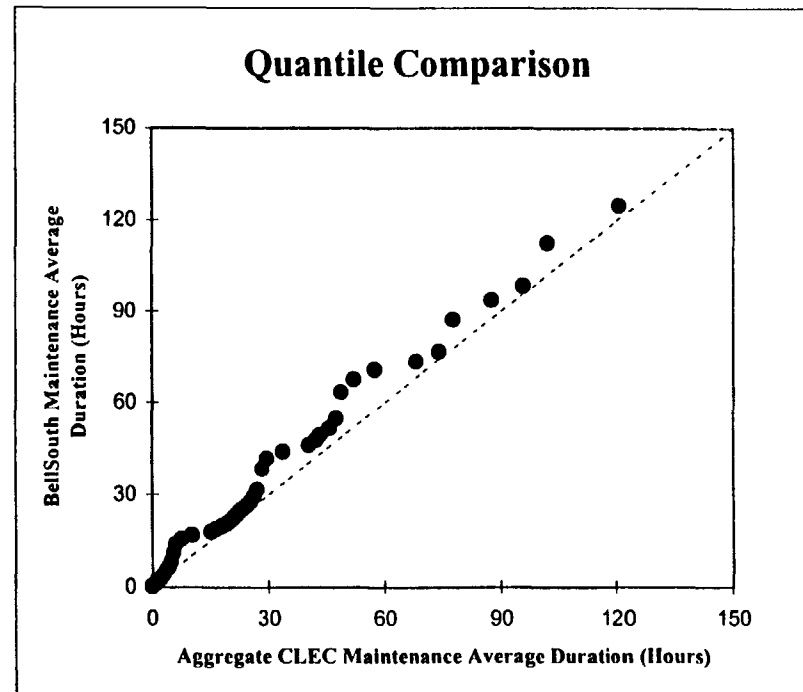
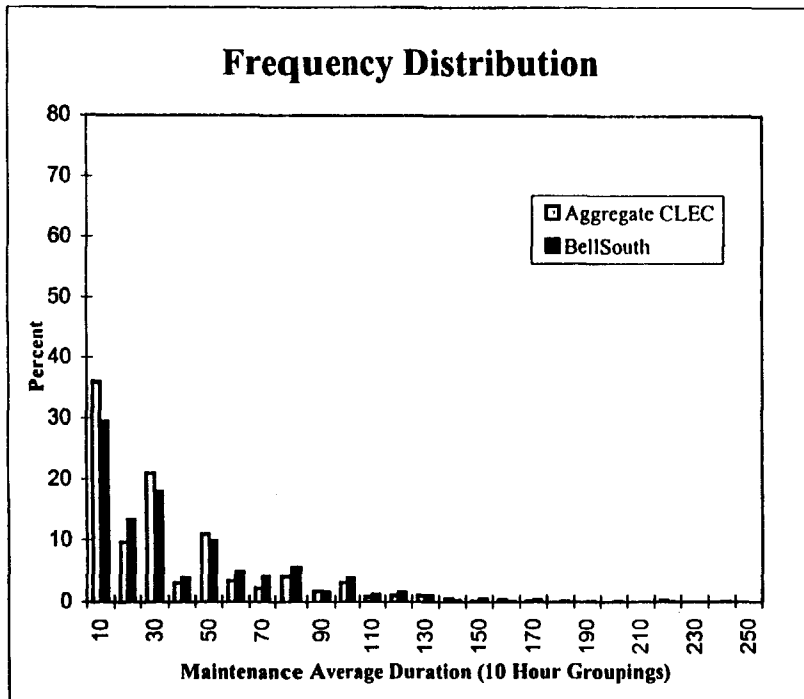
Service Provider	Mean	Standard Deviation
BST	33.11	34.39
CLEC	30.59	33.54
Difference	2.52	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	1.74	4.1195
FCC	1.74	4.1094
BST	1.04	15.3268

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted September BellSouth and CLEC Average Duration-Maintenance Shreveport



Descriptive Measures

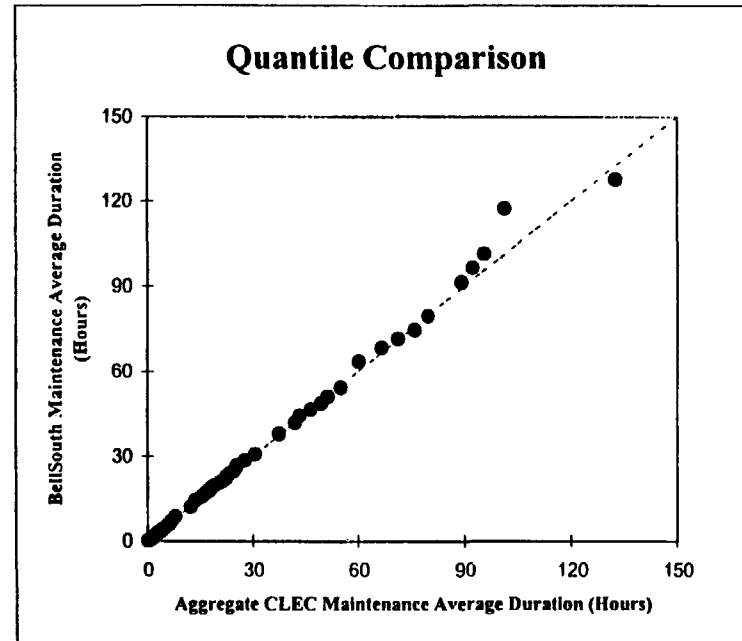
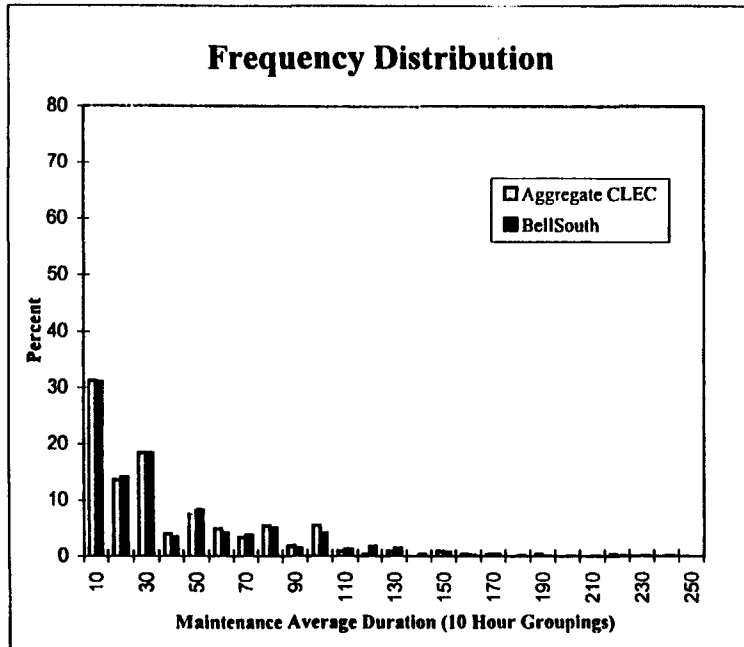
Service Provider	Mean	Standard Deviation
BST	34.71	35.04
CLEC	30.59	33.54
Difference	4.12	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	2.79	0.2631
FCC	2.79	0.2606
BST	2.35	1.2757

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted September BellSouth and CLEC Average Duration-Maintenance Lafayette



Descriptive Measures

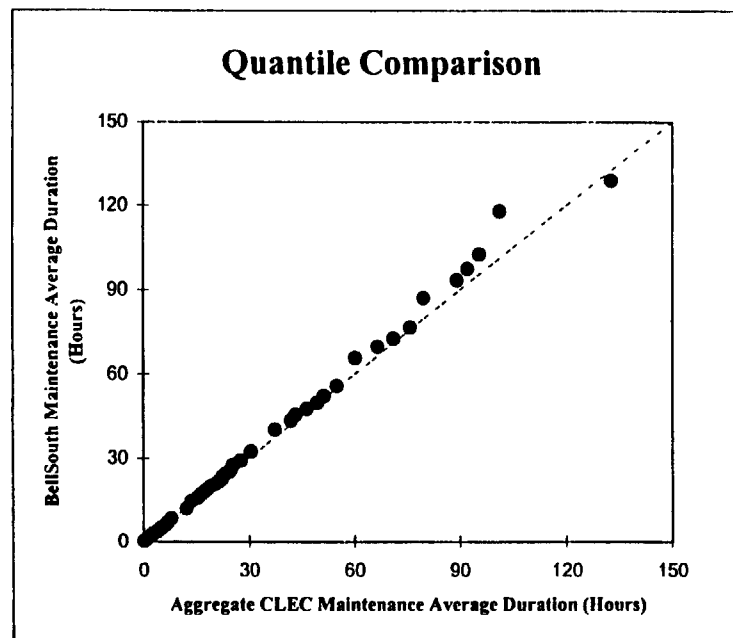
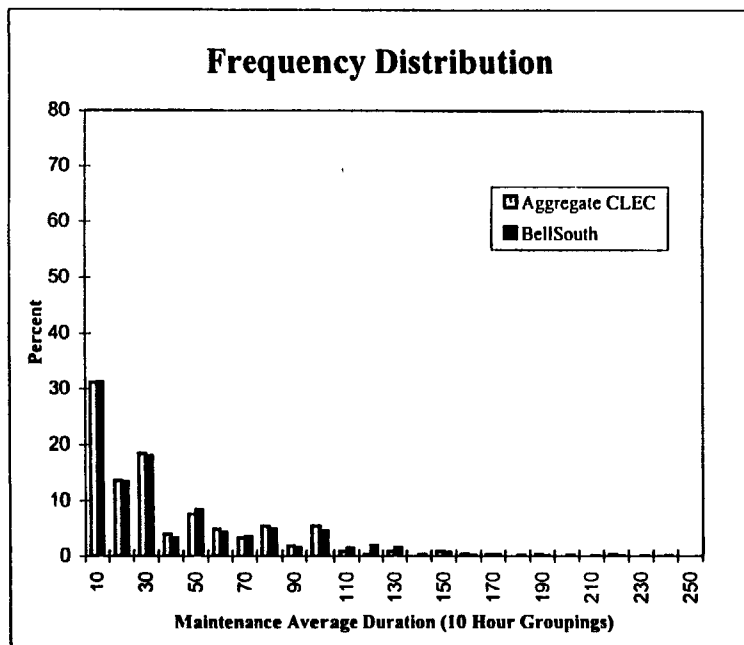
Service Provider	Mean	Standard Deviation
BST	34.31	36.13
CLEC	34.08	35.99
Difference	0.24	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	0.12	45.3007
FCC	0.12	45.3003
BST	0.10	46.0955

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted September BellSouth and CLEC Average Duration-Maintenance Lafayette



Descriptive Measures

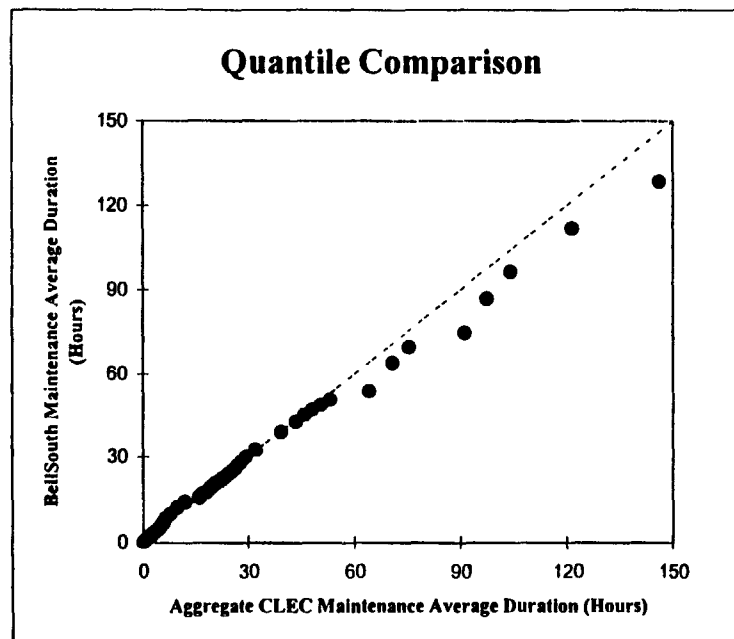
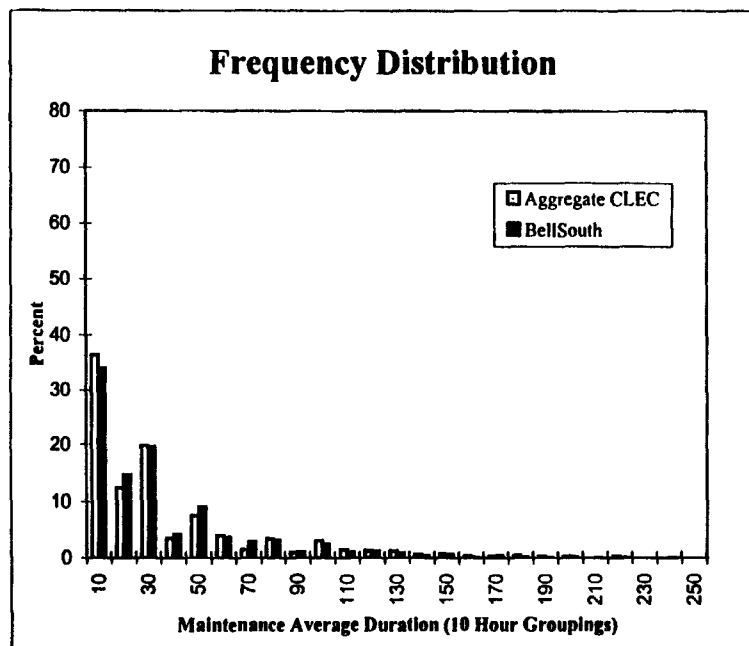
Service Provider	Mean	Standard Deviation
BST	35.14	36.93
CLEC	34.08	35.99
Difference	1.07	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	0.52	30.1862
FCC	0.52	30.1759
BST	0.40	34.6836

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted September BellSouth and CLEC Average Duration-Maintenance New Orleans



Descriptive Measures

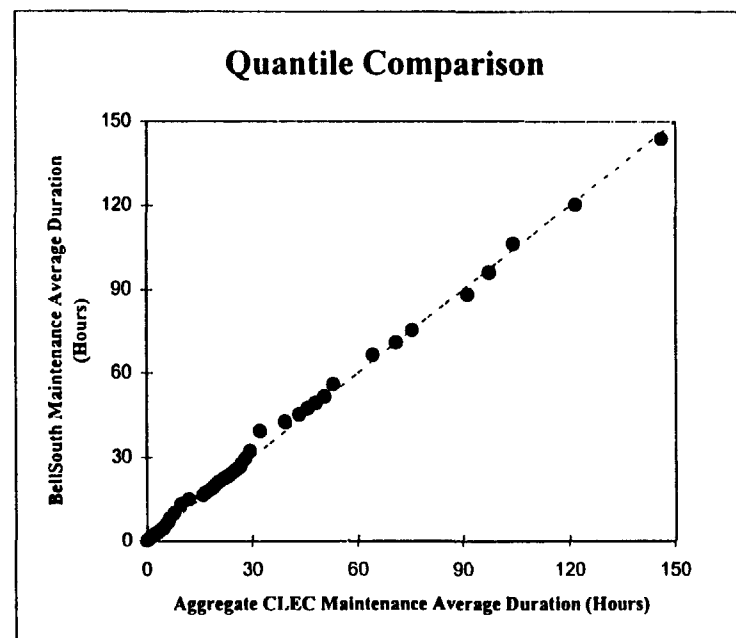
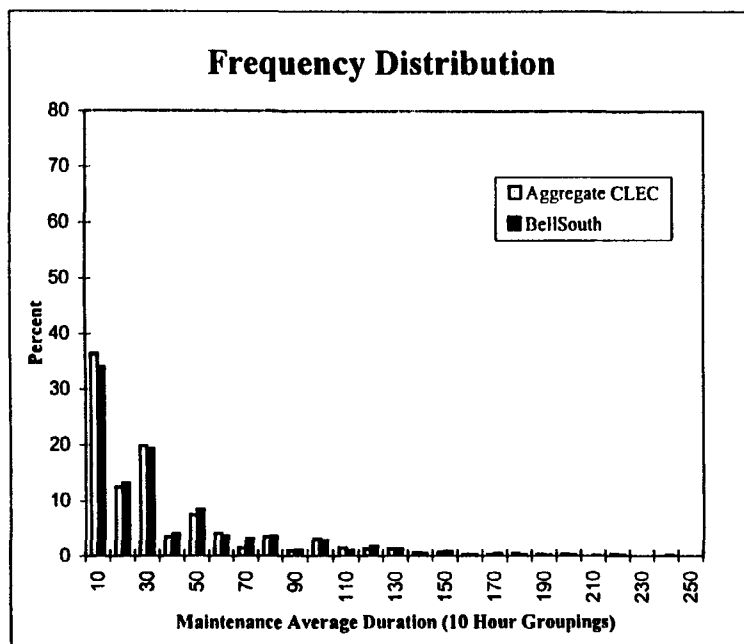
Service Provider	Mean	Standard Deviation
BST	30.01	33.75
CLEC	32.12	38.20
Difference	-2.10	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	-1.62	5.2435
FCC	-1.62	5.2865
BST	-0.89	18.9890

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted September BellSouth and CLEC Average Duration-Maintenance New Orleans



Descriptive Measures

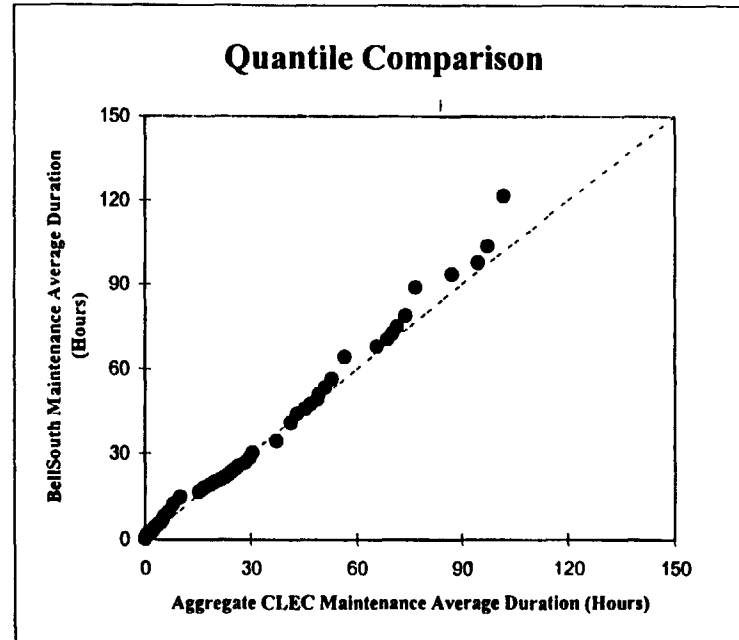
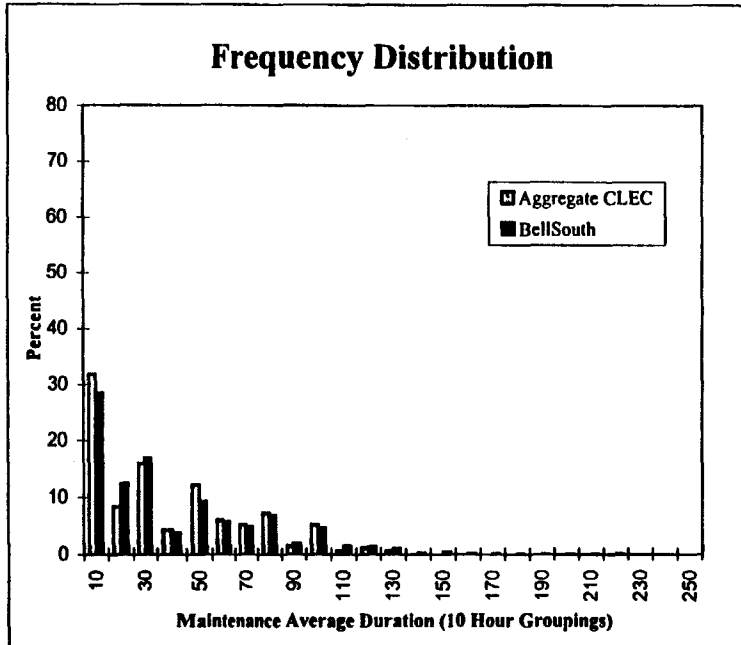
Service Provider	Mean	Standard Deviation
BST	32.59	37.19
CLEC	32.12	38.20
Difference	0.47	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	0.33	37.0821
FCC	0.33	37.0881
BST	0.21	41.7217

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Unadjusted September BellSouth and CLEC Average Duration-Maintenance Baton Rouge



Descriptive Measures

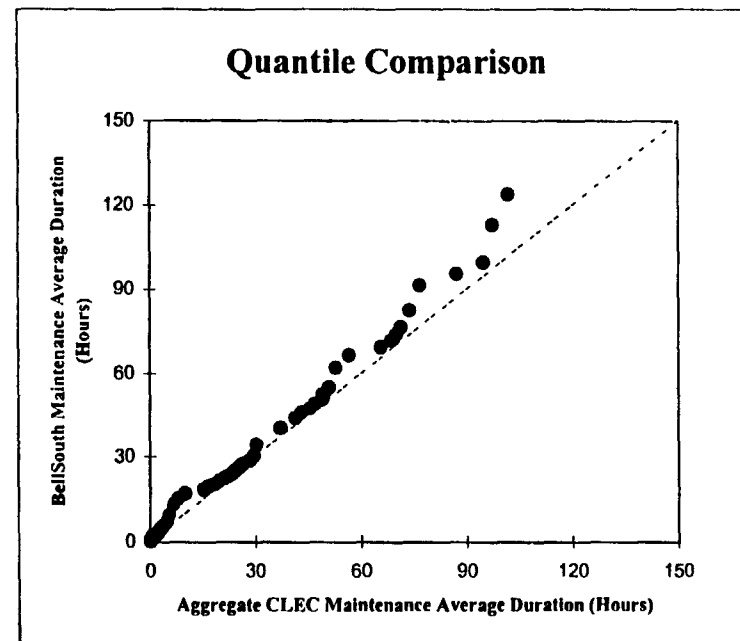
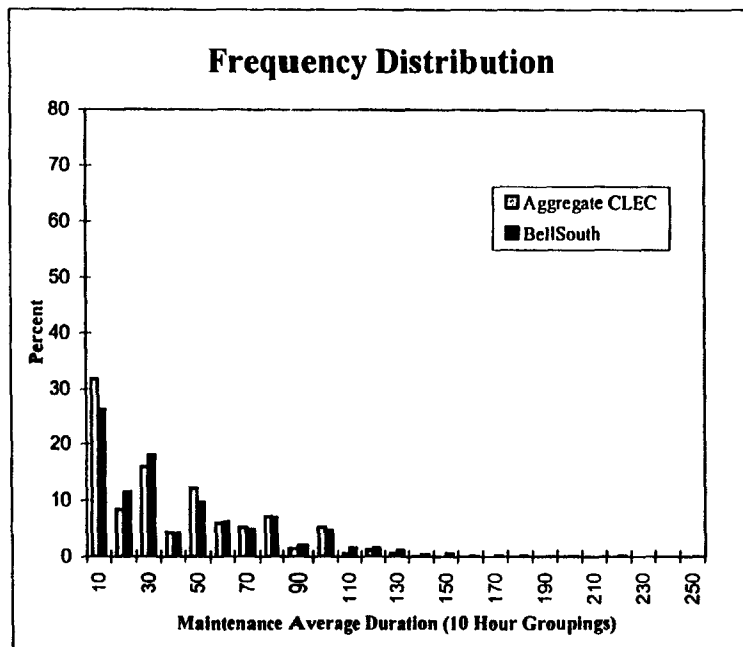
Service Provider	Mean	Standard Deviation
BST	36.28	34.29
CLEC	34.16	30.96
Difference	2.12	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	1.14	12.7325
FCC	1.14	12.6809
BST	0.48	31.8749

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Adjusted September BellSouth and CLEC Average Duration-Maintenance Baton Rouge



Descriptive Measures

Service Provider	Mean	Standard Deviation
BST	38.06	35.01
CLEC	34.16	30.96
Difference	3.90	

Analytic Measures

Testing Method	Test Statistic	P-value (percent)
LCUG	2.05	2.0178
FCC	2.06	1.9922
BST	1.34	9.7173

Data used in analysis includes only direct customer reports. The results exclude in public service lines and durations > 240 hours

Appendix J
Aggregate Assessment of Nondiscrimination - Multiple Testing Issues

I. Background.....	J-1	IV. Alternative Procedures.....	J-6
II. Lack of Independence.....	J-2	V. Potential Problems	J-7
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Appendix J

Aggregate Assessment of Nondiscrimination – Multiple Testing Issues

Background

It has been suggested that the results from a large number of BellSouth/CLEC performance parity tests could be combined and used to determine whether BellSouth is in compliance with its nondiscrimination obligation. In our view, while it is necessary to consider more than one performance measure when checking for parity, one must be careful in choosing the total number of tests to use.

It is important to realize that, due to random fluctuations inherent in statistical testing, BellSouth may fail some tests even though parity actually exists. The chance of this occurring increases with the number of tests that are aggregated. Dr. Colin L. Mallows, of AT&T Laboratories, describes a procedure for aggregating the results of many test that recognizes this fact.¹ His procedure contains two dimensions of statistical comparisons:

- a) the number of tests that fail in any monthly period must not be too large, and
- b) the number of tests that fail for three consecutive months must not be too large.

The statistical reasoning behind the procedure is based upon two key assumptions:

- a) all parity measures within a given month are independent, and
- b) consecutive monthly values of each parity measure are also independent.

In what follows, we

- 1. argue that these assumptions are questionable,
- 2. provide an example, via simulations, that shows that the suggested procedure does not produce the desired overall false alarm rate² when some measures are dependent,
- 3. suggest an alternative method for adjusting the false alarm rate of each individual test so

¹ Affidavit of Dr. Colin L. Mallows before the Federal Communications Commission, Washington, DC 20554. In the Matter of "Performance Measurements and Reporting Requirements for Operation Support Systems, Interconnection, and Operator Services and Directory Assistance." CC Docket No. 98-56, RM 9101. Section I, subsection D, ILECs' Compliance With Their Nondiscrimination obligations Should Be Based On An Aggregate Assessment Of Parity.

² The Type I error rate. A Type I error is concluding that parity does not exist when it in fact does. The probability that the given procedure leads to a Type I error is the false alarm rate.

- that the resulting overall false alarm rate is no higher than the desired level,
4. show that other problems are encountered when the alternative method is used with too many tests, and
 5. recommend that the total number of tests used to judge nondiscrimination be kept to a small number of independent tests, perhaps one from each of the main service quality measurement categories.

Lack of independence

Many performance measures within the same Service Quality Measurement categories are calculated from a common set of data. While the measures quantify different aspects of performance, the fact that certain common variables are used in the calculations suggests that the measures will be correlated.

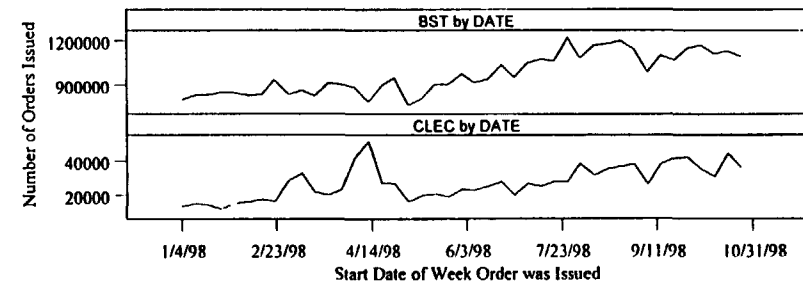
The Order Completion Interval, the Held Order Interval, and the Jeopardy Notice Interval all get quantified in two ways: by the average value, and by the distribution of the number of days in the interval. If, for example, parity tests of both the average and the proportion of intervals greater than five days are both included in an aggregation of tests, then there would be dependencies at least between the measurement pairs for each type of interval.

The Percent Missed Installation Appointments and the Order Completion Interval are also confounded. Those orders that

have missed installation appointments will have longer completion intervals.

As for the independence of a particular measure between consecutive months, one needs to consider business trends over time. Figure 1 shows the number of weekly BST and CLEC service requests for the whole BellSouth region over the first ten months of 1998.

Figure 1 - Number of Weekly Service Request During the First Ten Months of 1998

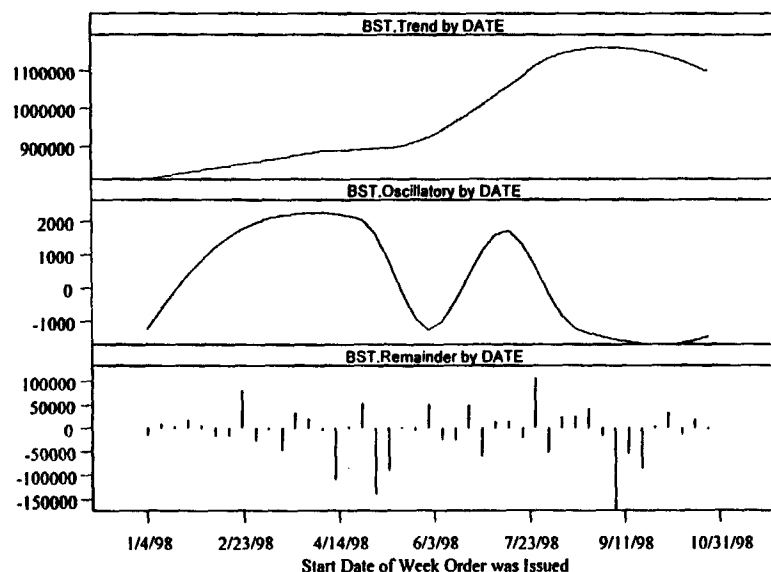


It is apparent that both the BST and CLEC series exhibit both an increasing trend, as well as some oscillations about that trend. To get a clearer picture of this, we can decompose each series into a trend, oscillatory, and remainder components.

We can do this by using repeated loess fitting as described by Cleveland.³ Figure 2 show the results of this decomposition for the BellSouth series. Figure 3 show the CLEC results.

³ Cleveland, W. S. (1993), *Visualizing Data*. Hobart Press, Summit, New Jersey.

Figure 2 - Decomposition of Weekly BellSouth Service Request Totals



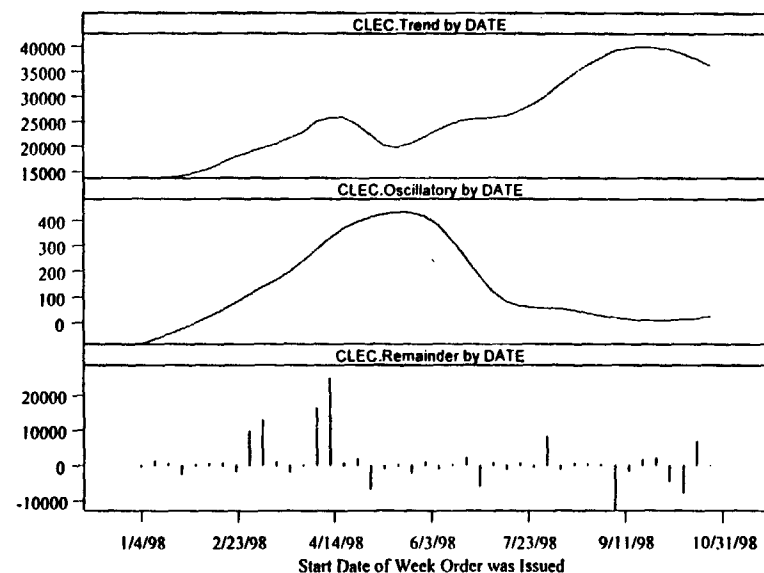
Both BellSouth and the CLECs have similar trend functions which show the effects of Hurricane Georges at the end of September. The oscillatory components are not alike.

BellSouth's data shows two oscillations, while the CLEC data shows just a single rise and fall. In fact, the CLEC data reaches a peak at about the same time point that the BellSouth data reaches a low point.

The remainder components for both series do not appear to follow any functional form. A check on this data was done,

and both remainder series do not show any autocorrelation. Thus, they appear to be "white noise."

Figure 3 - Decomposition of Weekly CLEC Service Request Totals



Because of the structure present in business trends like these, one would expect many of the performance measures to have similar values in consecutive months. And parity tests that are based on measures that have month-to-month correlation will also exhibit correlation.

Effects of dependence on AT&T's suggested procedure

AT&T's suggested procedure calls for identifying three values:

1. the number of allowed individual parity test failures in a month, denoted by k_1 ,
2. the number of allowed three-consecutive-month failures of a parity test, denoted by k_2 , and
3. the common false alarm rate of the individual tests, denoted by α_1 .

AT&T suggests that k_2 be set to zero, arguing that the expected number of parity tests that fail in three consecutive months is small. This calculation assumes independence of tests from month-to-month.

The overall false alarm rate, α , is a function of

- a) the three values k_1 , k_2 , α_1 , and
- b) the total number of individual parity tests, N .

By setting $k_2 = 0$, and assuming independence of tests within a month, as well as independence across consecutive months, the equation can be written as

$$\alpha = 1 - (1 - \alpha_1^3)^N \cdot P(k_1, N, p).$$

$P(k_1, N, p)$ is the cumulative binomial distribution. This gives the probability that there are at most k_1 false parity test failures out of N total parity tests when the probability of an individual false parity test failure is p . The false parity test failure probability, p , is computed as

$$p = \frac{\alpha_1 - \alpha_1^3}{1 - \alpha_1^3}.$$

By using this function, values of k_1 and α_1 can be found that provide a desired value of α .

For example, suppose that $N = 100$ parity tests are to be performed with an overall false alarm rate of 5 percent. Then it can be shown that $k_1 = 8$, and $\alpha_1 = 0.0460$ (4.6 percent). If an individual parity measure is calculated by standardizing the difference of average BellSouth and average CLEC performance (where the CLEC value is subtracted from the BellSouth value), then a conclusion of discriminatory behavior is reached if the parity measure is "too small."

The notion of "too small" is quantified by finding the value, C , in the parity measure distribution for which 100 α percent of all values are less than it.⁴ Under the right conditions, the parity measure distribution can be considered to be a standard normal distribution. In the previous example, the false alarm rate was 4.6 percent. Using a standard normal distribution, the critical value for the test is $C = -1.685$.

To see what happens when dependence exists between a set of parity tests within a given month, we performed a simple simulation experiment. Since we are only simulating parity measures within a month, the equation for determining k_1 and α_1 simplifies to

⁴ This assumes that one wants to have a one tailed test. If a two tailed test is desired, then the point of discrimination is reached at the value of the parity measure distribution for which 100($\alpha/2$) percent of all values are less than it.

$$\alpha = 1 - P(k_1, N, \alpha_1).$$

We set the overall false alarm rate $\alpha = 0.05$ (5 percent). The simulation proceeded as follows.

1. Set the total number of parity tests $N = 5, 10, 50, 100, 500, \text{ or } 1000$.
2. Calculate k_1 , α_1 , and C by
 - a) finding the value of k_1 such that $1 - P(k_1 + 1, N, 0.05) \leq 0.05 \leq 1 - P(k_1, N, 0.05)$,
 - b) finding the value of α_1 such that $1 - P(k_1, N, \alpha_1) = 0.05$, and
 - c) finding the value of C from the standard normal distribution so that $100\alpha_1$ percent of the distribution is less than C .
3. Generate a multivariate observation $Z = (Z_1, Z_2, \dots, Z_N)$ of parity measure results from a multivariate normal distribution where the correlation between parity measures Z_i and Z_j is given by

$$\text{corr}(Z_i, Z_j) = 1 - \frac{|i - j|}{N - 1}, \quad i, j = 1, \dots, N$$

So, for example, if $N = 5$, then the

correlation matrix is given by

$$\begin{bmatrix} 1 & .75 & .5 & .25 & 0 \\ .75 & 1 & .75 & .5 & .25 \\ .5 & .75 & 1 & .75 & .5 \\ .25 & .5 & .75 & 1 & .75 \\ 0 & .25 & .5 & .75 & 1 \end{bmatrix}.$$

4. Count the number of times $Z_i < C$, $i = 1, \dots, N$. If this count is more than k_1 , then tally this case as a false indicator of discrimination.
5. Repeat steps (3) and (4) 10,000 times.
6. The total tally of false indicators divided by 10,000 is an estimate of the overall false alarm rate of the aggregate test.

Table 1 shows the results of the simulation. Notice that the estimated overall false alarm rate is greater than the desired rate of 5 percent – especially as N gets large.

Table 1 - Summary of Simulation Results, the Consequences of Assuming Independence when Parity Tests are Correlated

Total Number of Tests N	Number of Allowable Test Failures k_1	Individual False Alarm Rate $100\alpha_1\%$	Critical Value C	Estimated Overall False Alarm Rate $100\alpha\%$
5	0	1.02	-2.3187	5.61
10	1	3.68	-1.7894	6.93
50	4	4.02	-1.7479	7.78
100	8	4.78	-1.6670	8.45
500	32	4.87	-1.6577	9.92
1000	61	4.99	-1.6455	9.55

The desired overall false alarm rate is 5 percent.

These results are only good for the type of correlation that was assumed to exist between parity measures. The correlation structure that is described above was chosen because it has a uniform mix of correlation levels between the parity measures.

While there is evidence that correlation exists between some parity measures, we do not know the exact nature of the structure across a set of parity measures. Thus, this simulation is only an example of what can happen to the overall false alarm rate when procedures based on independence of parity measures are used.

Alternative Procedures

If the distribution of the N monthly parity measures are reasonably approximated by a multivariate normal distribution,

then one can use Scheffé's S-Method of multiple comparisons.⁵ This method depends upon inverting a correlation matrix. If one wants to have a computationally feasible problem, then a small number of parity tests should be considered.

If there is concern about the appropriateness of using the multivariate normal distribution to model the distribution of the N monthly parity measures, then one can employ the Bonferroni inequality.⁶ This is a relationship which holds whether or not the individual parity tests are independent.

Let Z_1, \dots, Z_N be the results of N monthly parity measures, C be the common critical value for the parity tests, and α_1 the common false alarm rate for each parity test. If one sided tests are being performed, the Bonferroni inequality can be written as

$$1 - P(Z_1 \geq C, \dots, Z_N \geq C) \leq \sum_{i=1}^N P(Z_i < C) = N \cdot \alpha_1.$$

The left side of this relationship is the probability of having at least one parity tests out of N fail. The relationship implies that if you do not allow any parity test failures out of the N monthly tests, then the overall false alarm rate when performing multiple comparisons is no more than

$$\alpha = N \cdot \alpha_1.$$

⁵ Scheffé, H. (1959), *The Analysis of Variance*, J. Wiley & Sons, Inc., New York.

⁶ The Bonferroni inequality is discussed in numerous probability and statistics text books. For example, Mendenhall, W., Scheaffer, R.L., and Wackerly, D. D. (1986), *Mathematical Statistics with Applications, Third Edition*, Duxbury Press, Boston.

Thus, you can obtain a maximum overall false alarm rate of α if you set the individual test false alarm rate to α/N .

Potential Problems

The two methods suggested in the previous section may cause problems if the number of monthly parity test is large. It has already been pointed out that Scheffé's S-Method may be computationally infeasible for large N . Using a Bonferroni approach presents two other types of problems.

First, the fact that no failures are allowed over all the tests may be an overly strict rule when N is large. This is compensated for by making the individual false alarm rate small. But this just means that only very extreme parity measures will result in a discriminatory conclusion.

Second, very small false alarm rates correspond to extreme critical values, but determining these values may not be easy. And they may also not be the same for all parity tests.

To get an understanding of this, suppose 1,000 monthly parity tests are to be performed with an overall false alarm rate of 5 percent. Then the individual test false alarm rate is 0.005 percent. If we use the standard normal distribution to determine the critical value then $C = -3.891$.

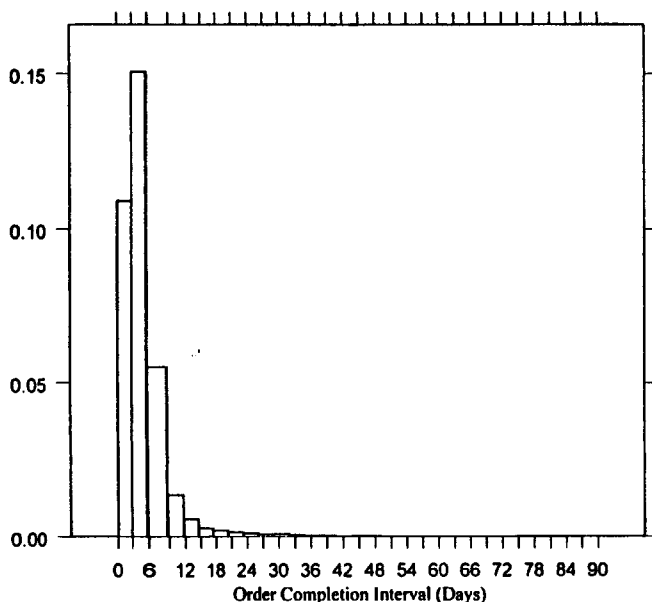
A provisioning measure like the order completion interval is recorded in terms of whole days, and often has a few extreme values. Thus, it is a highly skewed, discrete distribution.

The Central Limit Theorem states that the distribution of the average of a sample of values can be approximated by the normal distribution provided the sample is "large enough."⁷ Determining how large is "large enough" depends on the underlying distribution of the data. Skewed distributions tend to need larger samples than symmetric ones, though.

To see what happens when computing parity measures from such distributions, we conducted a simulation experiment. We used the empirical distribution of the BellSouth, August Order Completion Interval (OCI) data for dispatched, residential orders with less than ten circuits to draw samples from. Figure 1 is a histogram of this data. The histogram shows that this is a highly skewed distribution.

⁷ In general, it does not matter what the underlying distribution of the sample values is, provided certain conditions are met. A distribution with finite variance is sufficient for the theorem to hold, although there are more general conditions under which the theorem is valid.

Figure 4 - Distribution of BellSouth's Order Completion Interval for Dispatched, Residential Orders with Less Than 10 Circuits



The simulation was conducted using the following steps.

1. Draw a sample of size 8,000 from the OCI distribution. This represents the BellSouth orders for the month.
2. Compute \bar{x}_B and s_B , the sample mean and standard deviation of the BellSouth sample.
3. Draw a sample of 500 from the OCI distribution. This represents the CLEC orders for the month.

4. Compute \bar{x}_C , the sample mean of the CLEC sample.
5. Compute the LCUG parity measure

$$z = \frac{\bar{x}_B - \bar{x}_C}{s_B \sqrt{\frac{1}{8000} + \frac{1}{500}}}$$

6. Repeat steps (1) through (5) 100,000 times, storing the z scores.

Figure 2 is a Normal Q-Q Plot of the 100,000 z scores. This is a plot of the estimated quantiles of the parity measure distribution against the same quantiles of the standard normal distribution. If the distribution of the parity measure is normal, the plot should look like a straight line.

The plot shows that the parity measure distribution differs from a normal distribution in the extreme tails. This, though, is the region that determines the critical value for individual tests if the Bonferroni method is used with a large number of tests.

Figure 5 - Normal Q-Q Plot of 100,000 Simulated LCUG Z Scores

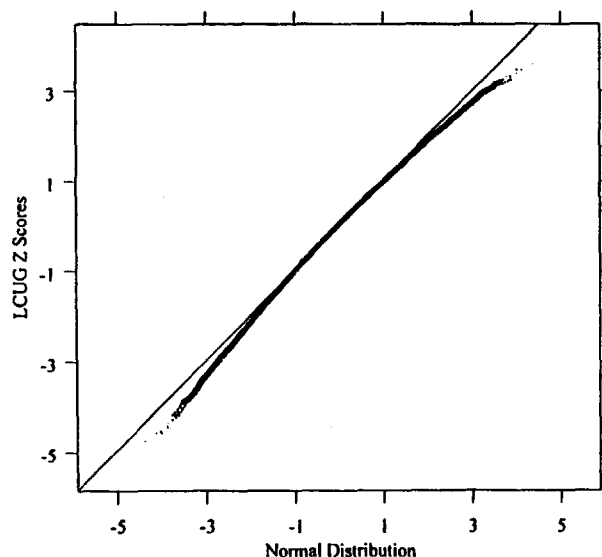


Table 2 gives a numerical comparison of some of the quantiles of the simulated parity measure distribution with the standard normal quantiles. They compare fairly well between the 10th and 85th percentiles, and might be acceptable if the range is expanded to include the 0.5 percentile on the low end, and the 95th percentile on the high end.

Table 2 - Quantile Comparison of the Simulated LCUG Z Score and the Standard Normal Distributions

Percentile	Estimated LCUG Z Quantile	Standard Normal Quantile
0.5	-2.802	-2.576
1	-2.506	-2.326
5	-1.720	-1.645
10	-1.312	-1.282
0	0.029	0.000
80	0.840	0.842
85	1.022	1.036
95	1.578	1.645
99.5	2.372	2.576

In terms of applying the Bonferroni inequality to find the individual false alarm rate of each parity test, these results suggest the following.

If the desired overall false alarm rate is 5 percent, then the value of N should not be larger than 10.⁸

These results only pertain to samples from distributions similar to the empirical distribution used in the simulations. But they do point out possible problems when using the Bonferroni methodology with a large number of monthly parity tests.

⁸ The value of the individual false alarm rate is 5 percent divided by 10. This results in .5 percent, which is the minimum value of agreement between the LCUG Z and standard normal quantiles.

Conclusions

The quantification of performance is an important aspect of quality management. Therefore it is important that BellSouth continue to measure its performance in many different ways.

When it comes to making judgements as to whether or not BellSouth is meeting its nondiscriminatory obligation with respect to the service it provides CLECs and their customers, there are potential problems that can arise when the results of too many parity tests are aggregated. These problems include: dependencies that exist between parity tests, dependencies between consecutive monthly measurements, and parity measures with non-normal distribution.

Our analysis indicates that these problems are negligible when the results of only five to ten parity tests are aggregated in any given month. Furthermore, to guard against dependencies between parity test, a methodology based on the Bonferroni inequality should be used in the aggregation process.

It is useful to point out that both the Bonferroni methodology and the AT&T proposed methodology are approximately the

same when only five parity tests are aggregated. When applying AT&T's procedure to five parity tests, no failures are allowed within a month, and the false alarm rate for each individual test is 1.02 percent. A Bonferroni approach would call for pretty much the same procedure – the individual false alarm rate, though, is exactly 1 percent.

Also, if the number of tests is under ten, then the individual test false alarm rate will be greater than 0.5 percent when a Bonferroni procedure is used. This means that the critical value for the individual tests will not come from the extreme tail of a theoretical distribution like the standard normal or Student's t distribution. This is important since simulations suggest that the distribution of extreme values for some parity scores are not modeled well by these distributions.

With respect to comparing parity tests over time, more information is need before we can recommend a procedure. For example, data from more months should be examined to determine the extent of dependencies between monthly parity test results.

Appendix K
Glossary of Acronyms and Statistical Terms

I. AcronymsK-1

II. Statistical TermsK-1

Appendix K

Glossary of Acronyms and Statistical Terms

This glossary defines some of the acronyms and the technical statistical terms found in the body of the report. A general reference to consult for more detail is Snedecor, G. and Cochran, W.G. (1989), *Statistical Methods, Eighth Edition*, Iowa State University Press, Ames.

Acronyms

BST: BellSouth Telecommunications, Inc.

CLEC: Competing Local Exchange Carriers

DOE: Direct Order Entry System

FCC: Federal Communications Commission

IID: Independent and Identically Distribution

ILEC: Independent Local Exchange Carriers

LENS: Local Exchange Negotiation System

LCUG: Local Competition User Group

LATA: Local Access Transport Area

OSS: Operating Support Services

RNS: Regional Negotiation System

SQM: Service Quality Measurement

UNE: Unbundled Network Element

Statistical Terms

Adjusted Data: Scaling down the volume of the BellSouth data so the variables can be more accurately compared to CLEC data.

Biased Estimate: An estimate is biased if there is a systematic tendency to overestimate or to underestimate the variable being estimated.

Central Limit Theorem: One of the most fundamental theorems of statistics, it states that even if the original population is not normally distributed, the distribution of means from repeated random samples will be approximately normal.

Confidence Interval: Indicates the precision of an estimate. A 95 % confidence interval is a range of values (the estimate + or - some value) such that, were the experiment repeated many times, approximately 95% of the ranges would contain the true population value.

Correlation: Measures the strength of the relationship between two variables. A correlation coefficient ranges from -1 to +1 and indicates a positive relation (+ values) or an inverse relation (- values); the closer the value is to +1 or -1, the stronger the relationship between the two variables.

Critical Value: The value of the test statistic that separates the acceptance region from the rejection region.

Critical Region: A region of test statistic values for which the null hypothesis is rejected. Also called the rejection region.

Degrees of Freedom: Relates to the calculation of the variance -- $(n - 1)$ deviations from the mean.

Estimate: An estimate is any value calculated from a sample.

Favor: Statistically Significant differences that are +2 or larger are defined to be differences which "favor" the CLECs; those that are -2 or smaller are defined to be differences which "favor" BellSouth.

(Relative) Frequency Distribution: An initial indication of what the data look like, that is how the data are distributed. A frequency distribution indicates the number of observations falling within a given class. A relative frequency distribution shows the proportion of observations that fall into each class.

Heavy Tailed Distribution: See normal distribution. A concentration of observations at one end of the distribution. For example, a distribution of the weights of elephants at a zoo would probably have mostly large weight values and few small values. The distribution of this data would have a heavy tail on the right side, indicating a disproportionate number of observations with large values.

Homoscedasticity: If all the error terms have the same variance, the errors are homoscedastic. If the error terms do not have the same variance, they are called heteroscedastic.

Independence / Dependence: Observations A & B are said to be independent when the value of observation A has no influence on the value of observation B. Observations C & D would be dependent if the value of observation C influences the value of observation D, or vice versa.

Least Trimmed Squares Regression¹: A regression technique introduced in Rousseeuw (1984). This regression method minimizes the sum of the q smallest squared residuals, where q is an integer between (roughly) $n/2$ and n . This method is robust in that it guards against extreme outliers influencing the functional fit.

Mean: The average value of a set of quantitative data.

Normal Distribution: A set of data has a normal distribution if a graph of the distribution produces a bell-shaped curve. Most of the observations are concentrated near the middle (mean) of the distribution and as you move outward from the middle, either left or right, there is gradually less and less data. A Standard Normal has a mean of 0 and a variance of 1.

Null Hypothesis: A statistical hypothesis is a statement about one or more parameters of a population distribution that requires verification. The null hypothesis is the one whose tenability is actually tested.

One- and Two-tailed tests: A statistical test for which the critical region is in either the upper or lower tail of the sampling distribution is called a one-tailed test. If the critical region is in both the upper and lower tails of the sampling distribution, the statistical test is called a two-tailed test.

¹ Rousseeuw, P.J (1984). Least median of squares regression. Journal of the American Statistical Association, 79, 871-881.

Outlier: Extreme values found in the data. Outliers can skew the value of the mean. Outliers are often removed to prevent undue influence upon the estimates for the data.

P-value: The P-value indicates if a test statistic is statistically significant. If the P-value for a test statistic in a one-tailed test is greater than 5%, then generally speaking, the test is not considered statistically significant.

Percentile: If all the observations are arranged in ascending order, the Nth percentile is the value of X such that N% of the observations are less than or equal to X. For example, we could say that 25% of the observations are less than \$15 and 75% of the observations are greater. Thus, \$15 would be the value of the 25th percentile.

Quantile: The first quartile is a particular quantile. The value that the distribution takes at the 25th percentile.

Replicate Method: A statistical method that involves the partitioning of a sample into subsamples. See Appendix B.

Sample: A part or piece taken as representative of a whole group (population).

Simulation: A controlled statistical sampling technique (experiment) that is used, in conjunction with a model, to obtain approximate answers for questions about complex, multifactor probabilistic problems, usually using a computer. It is most useful when analytical and numerical techniques cannot supply answers

Standard Deviation: indicates how the data are spread about the mean; the larger the standard deviation, the more spread out the

data about the mean. Can be calculated for any set of data but it is most meaningful when the data are symmetric. The standard deviation is the square root of the variance.

Statistically Significant: A statistically significant result is a result that cannot be reasonably explained by sampling error. In this report, statistical significance is defined to have been reached when the test statistic is outside the range ± 2 . By convention, when the difference is positive, we say the measure suggests that the CLECs resale customers are getting better treatment than BST retail customers. The reverse is true if the sign of the difference is negative. See "favor."

Symmetric: A distribution is described as symmetric if the left half of the distribution is the mirror image of the right half. A distribution is skewed if it is not symmetric. A distribution is heavy tailed if data are concentrated in one of the tails.

Test Statistics - Z-test and t-test (modified z-test, pooled z-test): A test statistic is used to make a decision about a parameter by testing hypotheses. Hypothesis testing helps us to choose between two conflicting hypotheses, a null and an alternative hypothesis, about the possible values of the parameter in question. These hypotheses make statements about the value of a particular parameter or groups of parameters. A critical value is calculated which determines what values of the test statistic will result in the acceptance of the null hypothesis and what values will result in the rejection of the null hypothesis. If the test statistic computed assumes a value in the rejection region, the null hypothesis is rejected in favor of the alternative hypothesis.

Time Series: An ordered sequence of observations, usually in terms of time. The observations are dependent or correlated, so the order of the observations is important. We can describe a

set of data by examining how the data change over time and if there is a describable pattern of behavior over time.

Variance: A summary statistic for measuring variation in a set of data. This measure of central tendency measures the average of the square deviations from the mean. See **standard deviation**.